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BOARD OF NATURAL RESOURCES
COLSTRIP HEARINGS

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TRANSCRIPT OF PROCEEDINGS
FOR

FEBRUARY 19, 1976

PAGES 5701-5956

INDEX

Colstrip 3 & 4 — Page

WITNESSES

February 19, 1976, Thursday

WESTLEY DEITCHLER

Oral Statement 5702

Cross, by Department of Natural Resources and Conservation 5704

IBRAHIM JOSEPH HINDAWI

Written Direct Statement 5711

Cross, by Applicants 5724

Redirect, by Department of Natural Resources and Conservation 5748

Re-cross, by Applicants 5752

LYLE FONTAINE

Written Direct Statement 5756

Oral Supplement to Written Statement 5758

Cross, by Department of Natural Resources and Conservation 5758

EARL CHARETTE

Oral Statement 5759

Cross, by Department of Natural Resources and Conservation 5760

Cross, by Northern Cheyenne Tribe, Inc. 5760

HOMER HARRIS

Oral Statement 5764

Cross, by Department of Natural Resources and Conservation 5765

Cross, by Northern Cheyenne Tribe, Inc. 5765

INDEX

Colstrip 3 & 4

WITNESSES Page

February 19, 1976, Thursday (continuing)

MICHAEL L. MURPHY

Written Direct Statement 5770

Cross, by Department of Natural Resources and Conservation 5774

Cross, by Northern Cheyenne Tribe, Inc. 5779

GARY J. WICKS (Resumed)

Cross, by Applicants (continuing) 5786

Redirect, by Department of Natural Resources and Conservation 5842

Voir Dire, by Applicants 5845

Redirect, by Department of Natural Resources and Conservation (continuing) 5847

Re-cross, by Applicants 5849

JASE O. NORSWORTHY

Written Direct Statement 5852

Cross, by Department of Natural Resources and Conservation 5859

JOHN L. HANSEN

Written Direct Statement 5874

Cross, by Department of Natural Resources and Conservation 5880

M. E. EDDLEMAN

Written Direct Statement 5883

Cross, by Department of Natural Resources and Conservation 5887

N. H. ELLINGSEN

Written Direct Statement 5890

INDEX

Colstrip 3 & 4

WITNESSES Page

February 19, 1976, Thursday (continuing)

N. H. ELLINGSEN (continuing)

Cross, by Department of Natural Resources and Conservation 5895

ROBERT D. PILE

Written Direct Statement 5901

Cross, by Department of Natural Resources and Conservation 5905

J. P. BOYD

Written Direct Statement 5911

Cross, by Department of Natural Resources and Conservation 5913

TIMOTHY W. DEVITT

Written Direct Statement 5917

Cross, by Applicants 5922

Redirect, by Department of Natural Resources and Conservation 5949

THURSDAY, FEBRUARY 19, 1976

The hearing reconvened at 8:45 A.M. on Thursday, February 19, 1976, in the Chambers of the Montana House of Representatives, State Capitol, Helena, Montana.

The Honorable Carl M. Davis, Hearings Examiner, presided over the proceedings.

APPEARANCES:

Applicants:

William M. Bellingham, Esq.
John L. Peterson, Esq.
John Ross, Esq.

Department of Natural Resources and Conservation:

William G. Sheridan, Jr., Esq.
Donald MacIntyre, Esq.
Ted J. Doney, Esq.

Northern Cheyenne Tribe, Inc.

Peter Michael Meloy, Esq.

The following proceedings were had:

HEARINGS EXAMINER: Gentlemen, we'll go ahead with your testimony, since we have a little delay in our other schedule. So, Mr. Deitchler?

WESLEY DEITCHLER, appearing as a public witness, having been first duly sworn upon his oath, was examined and testified as follows:

HEARINGS EXAMINER: Would you sit in the witness chair right there, sir. Speak into the mike and state your name and address and whatever statement you wish to make in these proceedings.

STATEMENT OF WESLEY DEITCHLER

My name is Wesley Deitchler. I am a carpenter on the Bechtel Power Plant in Colstrip and worked there for two years building units 1 and 2. I'm also vice-president of the Tongue River-Yellowstone Action Committee in Rosebud County, but I'm not speaking as a representative of that group. I was born and raised in Rosebud County; lived on a farm there for many years; educated at the Montana State University in Bozeman.

I don't think what I'm going to say has been said in here before. I've thought alot about it and I don't know whether or not what I'm going to say is directly pertinent to the construction of 3 and 4. I'm not speaking in favor of 3 and 4; I'm speaking in favor of the right of any citizen, myself specifically, to act in my own interests. And if I defend that right, then I'm also defending the rights of Montana Power to build units 3 and 4 or 5 and 6 or whatever they so desire. It's none of my business, specifically, as a citizen, what Montana Power does on its own property in its own time. The only legitimate function that I, the citizen, could have relating to Montana Power's construction of 3 and 4 is this; that if at any time subsequent to the construction of 3 and 4, they damage property or the rights of others, then, that is a proper place for the government to enter into the picture.

What I've really been thinking about, with regard to these hearings, is that the function of these hearings is not to determine whether or not -- I don't believe these hearings have any relation to the construction of 3 and 4. I think the purpose -- the essential purpose of these hearings is to bog us down in the position of a person who can't see the forest for the trees. In other words, to bog us down in looking at each individual tree and not being able to see the forest. We're -- it's a logical fallacy in logic of these hearings and of the Board of Natural Resources, the Department of Natural Resources, is that they are not considered in context. The context of these hearings is one of fascism; in other words, one of the power or the control of industry, of business, of private individuals, by government. In a fascist state the government -- individuals retain ownership but not control what goes on in their daily actions and in the planning and carrying on of the daily functions of a particular business. In other words, you have the ownership and the responsibility of ownership and not the rights and benefits thereof.

I think that -- we're bound by the Utility Siting Act to consider the need for 3 and 4. The attorneys and the witnesses and all of the hearings will be devoted to that particular question. They are required to make a decision on it by law. I believe that the only right that the Board of Natural Resources could have with respect to 3 and 4 is to say to Montana Power, do you need 3 and 4; and if the answer, according to Montana Power is yes, then the Board of Natural Resources would of necessity have to say, then that is the only right that we have -- in assessing need, is to ask whether or not you need it; if you do, then, build it. If at that point you do something wrong, then we can come in.

Are there any questions or cross-examination of that?

HEARINGS EXAMINER: Does that complete your statement?

WITNESS: Yes.

HEARINGS EXAMINER: Then you can cross-examine.

EXAMINATION OF WESLEY DEITCHLER

Cross, by Department of Natural Resources and Conservation

By Mr. Sheridan:

Q Do you own a home, sir?

A Yes, I do.

Q Where is it at?

A In Colstrip.

Q Who would you go to if your water supply was cut off?

A I would go to Burtco Corporation.

Q What for?

A To get my water resupplied.

Q What if that water was contaminated?

A I would still go to Burtco.

Q And what if they didn't do anything for you?

A Then I would, at that point, seek some source of supply that was not contaminated.

Q I take it that it's your opinion that corporations ought to run this state, and maybe, the people, only when the corporations step on them, ought to look to the government; is that right?

A No. Now how would that be stepping on me?

Q Whose responsibility is it to maintain adequate water safety standards?

A Whoever supplies it.

Q Well, what about public water?

A What about it?

Q Does the corporation own the Yellowstone River?

A No, only that portion that they choose to use.

Q Oh, is that right?

A Yes.

Q What portion do they choose to use?

A Whatever portion that they pump out of it and they use.

Q And what happens to the other people who depend on that river?

A Well, I assume they'll pump out of it that which they need and use.

Q Let's assume there's not enough?

A Why would be assume that?

Q That's happened before, sir.

A On the Yellowstone River; I doubt it.

Q Let's just take water supplies.

A Okay.

Q They are drawn from the public; right?

A Not properly, but it's true that they are.

Q The only one who can buy anything, in your book, is the guy who has the proper right to it; is that correct?

A Would you restate that?

Q Yes. Anyone who could buy rights to something, has a prior right to it, in your book; is that right?

A Not a prior right; if you buy a right to it, then you have the right at that point, not prior to that.

Q And when things are limited in supplies, those who can buy are the ones who get, in your book; is that right?

A No, those who first use it have the right to it.

Q I'm quite interested in how you've reached the opinion that the Montana Power Company should have the right to go forward with Colstrip, and what considerations you, as an individual, have made to things other than just Montana Power Company's right to go forward. For instance, have you read the Environmental Analysis?

A I have read most of the summary of the Impact Statement, the blue covered book; yes.

Q You didn't bother to read the draft Impact Statement; do you have any idea the number of pages involved?

A No, you see --

Q The number of volumes involved?

A I am not concerned with the number of volumes, the number of pages or the content of an impact study. It isn't my business; it isn't my right to be concerned with an impact study of what will go on in that county and that project. My right consists only in the point after -- if damage is done; then I have a right to protest the normal government process. That's my only right.

Q There is no right, as you see it, by a citizen of this state, to question the appropriateness of that plant; is that your opinion?

A No right whatsoever. You see, because if I have the right to question the appropriateness of plant 3 and 4, then John

Doe has a right to question my construction of a house or drilling of a well, or whatever. You can't have that right. You have the power, maybe, if government usurps the power; but you can't have that right; it can't exist.
What you do on your own property is your right, if you have earned that property and choose to do it.

Q I take it, it follows that if what you do on your property, by a very good probability, would affect the neighbor people, and you know that before you do it, you don't have a right to challenge that, you have to wait until the damage is done; is that your opinion?

A Yes, because, for this reason: To provide justice, government has to presume what I do, presume me innocent until I can be proven otherwise. And there's a reason for this; because government is based on the monopoly of the use of force. If I don't use force against anyone else, no one has the right to initiate it against me. Period.

Q And in your interpretation of the Utility Siting Act, or the Major Facility Siting Act, the only question to be addressed by the Board is need?

A No, that is not the only question.

Q What else should be examined?

A I mean, I'm speaking in terms of my own interpretation of what should be examined.

Q Have you ever read that Act?

A No, I haven't. I've read some interpretations of it and of specific parts of it, but I haven't read the entire Act. Now I know, I realize that they are required to specify whether or not they consider other alternatives to the site and to the plants themselves. Now, that should also not be required.

Q Sir, you're here today to express your opinion?

A Yes, right.

Q And don't you think that maybe other people who would have opinions contrary to yours, would also have the right to express those opinions?

A Now, I am not expressing my opinion specifically at 3 and 4. I don't regard that as my right. When I attended the hearings in Forsyth, I did not regard that as my right. The concept of hearings to determine whether or not -- you see, if the government has the power to hold a hearing to determine whether or not a private individual, a private corporation, can perform an action in their own interest in accordance with their own best judgment, then they have the power, they simply are not exercising it of determining whether or not I have the right to act in my own interest.

Q I see, and without government intervention, is it your opinion that Montana Power Company should have the right to condemn your land because they think it's right, without the government being involved?

A No, sir. The power of condemnation requires government involvement.

Q Did you know that the Montana Power Company has the right of condemnation?

A They have only achieved that right because of government involvement in the past. In other words, that's been a process that has already been settled.

Q By the way, did the fascist state you're talking of allow
hearings of this nature?

A Pardon.

Q Did the fascist state that you discussed, did your comments
allow hearings of this nature?

A Prior to the complete formation of the fascist state, I'm
sure that they did.

Q Right, were you there?

A No, I was not.

MR. SHERIDAN: I don't have anything else.

HEARINGS EXAMINER: Mr. Meloy?

MR. MELOY: Nothing.

HEARINGS EXAMINER: Thank you very much, sir, for
your testimony.

(Witness excused.)

HEARINGS EXAMINER: Which one of you other
gentlemen want to speak next.

MR. SHERIDAN: Mr. Davis, Dr. Hindawi has got to
meet that morning plane if at all possible. If we
could go ahead --

HEARINGS EXAMINER: Okay, I wish you'd been here
at 8:30 when you asked to; we would have been a lot
further along, sir. Let's go ahead and sit down and
be sworn.

DR. IBRAHIM JOSEPH HINDAWI, called as a witness by the Department of Natural Resources and Conservation, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Please be seated.

MR. SHERIDAN: At this time we'll tender the witness for cross-examination and offer his statement along with the exhibits.

(THE WRITTEN DIRECT TESTIMONY OF DR. IBRAHIM JOSEPH HINDAWI WAS DIRECTED TO BE INSERTED AT THIS POINT.)

STATEMENT OF TESTIMONY

OF

IBRAHIM JOSEPH HINDAWI

I am Ibrahim Joseph Hindawi, Ph.D. in Plant Anatomy and Human Genetics, University of Utah, Salt Lake City, Utah. At present I am with the Environmental Protection Agency doing research study in Corvallis, Oregon.

I have held the present position since 1973, directing the ecological study of aerosol drift effect from salt water cooling system at Turkey Point, Florida, nuclear power plant. I am also currently engaged in research on the effects of SO_2 and acid mist on pine trees.

1971-1973, Plant Anatomist, Division of Ecological Research, National Environmental Research Center, Research Triangle Park, North Carolina: did research on the effect of acid rain, fly ash, and sulfur dioxide on scotch pine trees with respect to morphological and microscopical changes.

1965-1971, Chief, Vegegation Effects Section, Abatement Division, U.S. Public Health Service, Cincinnati, Ohio: was responsible for organizing, planning, conducting and evaluating the abatement study on the effects of air pollutants on vegetation.

1959-1965, Research Botanist, Medical and Biological Section, Air Pollution Division, Cincinnati, Ohio: Conducted research studies on the effects of irradiated automobile exhaust fumes on vegetation and gave technical assistance to local, city, state and other governmental agencies. Often called to lecture to biologists, chemists and engineers on training courses at the Air Pollution Center, colleges and universities.

Publications - Author and co-author of several publications on various aspects of effects of air pollution on vegetation.

VEGETATION EFFECTS OF COAL-FIRED PLANTS

Sulfur dioxide (SO_2) in the atmosphere is known to create many adverse effects upon health and welfare. It appears to be a major causal agent affecting vegetation. Out of 23,360,000 tons of sulfur dioxide emitted to the air over the United States in 1963, 60 percent was from coal burning, and about two-thirds of that was emitted by power generating plants that burn sulfur-bearing fuel. The remaining 40 percent of the 23,360,000 tons of sulfur dioxide comes from industrial and commercial buildings heated by coal or fuel oil, industrial facilities such as petroleum refineries, and some chemical plants (1).

Sulfur dioxide causes both acute and chronic plant injury. Acute injury is characterized by clearly marked dead tissue between the veins or on the margins of leaves as a result of exposure to high concentration of the pollutant for relatively short periods. Chronic injury is marked by brownish-red, turgid or bleached white areas on the blade of the leaf.

Plants are particularly sensitive to sulfur dioxide during periods of intense light, high relative humidity, adequate plant moisture and moderate temperature. They are, therefore, especially sensitive to sulfur dioxide during the growing season in late spring and early summer.

Length of exposure and levels of toxicant affect plant sensitivity to sulfur dioxide. Plants exposed to sulfur dioxide concentrations during the early or late daylight hours are less affected by the gas than plants exposed from 10:00 a.m.

to 2:00 p.m. At night, when the stomata (openings in the leaf for gas exchange with the atmosphere) of most plants are closed, the plants are much less susceptible to sulfur dioxide injury.

The degree of turgidity of test plants is extremely important in sulfur dioxide sensitivity. Soil dry enough to cause a slight wilting increases plant resistance to sulfur dioxide injury. Turgid tomato leaves are severely injured by sulfur dioxide, but slightly wilted leaves will be uninjured by the same concentration of the toxicant. Young plants are more resistant than old plants, and the middle-aged leaves are most susceptible. These differences are probably caused by variations in the number, size and activity of the stomata and the quality of the cytoplasmic contents of the cells.

Microscopic examination of leaf tissue injured by sulfur dioxide reveals that the mesophyll cells are affected and the chloroplasts become plasmolyzed or bleached out. The spongy tissues are more often more easily affected than the palisade. Under severe conditions the epidermis cells are also plasmolyzed. The mid-rib and large veins remain intact and green, even though most of the leaf has collapsed.

Low concentrations of sulfur dioxide can interfere with the growth and functioning of a plant without leaving visible injury. This invisible injury may interfere with or reduce photosynthesis. Grain crops may suffer a reduction in yield, especially if crops are damaged by sulfur dioxide at the blossom stage (2).

Reinert (3) reported reductions in several growth parameters for Bel W_3 tobacco variety when exposed to 0.1 ppm SO_2 8 hrs/day, 5/days/week, for four weeks in greenhouse exposure chambers. Other studies (4) demonstrated reduced roots weight of radishes without visible injury from sulfur dioxide exposures of 40 hr/wk for five weeks at concentrations of 0.05 and 0.06 ppm.

Injury to agricultural crops exposed to a given concentration of sulfur dioxide is greater than the injury to laboratory-exposed plants subjected to the same concentration. This is possibly due to additional toxicants present in the uncontrolled ambient atmosphere. Thus, injury to agricultural crops is usually greater than can be projected from laboratory experiments involving only one toxicant.

It has been reported that an ordinarily harmless concentration of sulfur dioxide, when combined with ozone, produced ozone-type injury to Tobacco Bel W_3 plants (5). No injury developed from exposure of similar plants to identical concentrations of the individual gases (Table 1).

Table 1. Synergistic Effect of Ozone and Sulfur Dioxide on Tobacco Bel W_3 Plants (5)

Duration, Hr.	O_3		SO_2	Leaf Damage, %
2	0.03			0
2			0.24	0
2	0.027	+	0.24	38
4	0.031			0
4			0.26	0
4	0.28	+	0.28	75

Laboratory work has indicated that a single four-hour exposure to nitrogen dioxide below 2 ppm or to sulfur dioxide below 0.7 ppm did not injure tobacco. Exposure for four hours to a mixture of 0.1 ppm of nitrogen dioxide and 0.1 ppm of sulfur dioxide produced moderate injury to the older leaves of Tobacco var Bel W_3. Preliminary experiments with ozone, nitrogen dioxide, and sulfur dioxide suggest that a mixture containing 0.05 ppm of each of these toxicants injures tobacco.

Hindawi and Gordon (7 & 8) reported broad leaf injury and abnormal growth on Scotch Pine at the Mount Storm area of West Virginia and Maryland. The local coal-fired power plants often caused injury to vegetation grown around the plant. In July 1972, 30 to 35 miles per hour winds of Hurricane Agnes reached the Mount Storm area, took the plume from the 350 foot stacks of 1160 megawatt coal-fired power plant (Exhibit 120) and pushed it along at ground level for over 15 miles. This fumigated pine trees and other broad leaf plants causing severe sulfur dioxide and acid mist injury (Exhibits 121, 122).

In the Mount Storm area there are approximately one million acres of Christmas tree plantations, cultivated by growers during the last 25 years. During the period from 1965 to 1971, two huge coal-fired power plants and a few small ones were built and began steam generation within a 50-mile radius of these conifer tree plantations. These power plants release about 788,000 tons of SO_2 annually into the atmosphere along with large quantities of nitrogen oxides, particulates, substantial quantities of fluoride and an unknown amount of trace elements (9). During my studies and observations in 1970, 1971, 1972 (10) I found that air pollutants occurred on farm locations 2, 10 and 15 miles away from the nearest coal-fired power plant. This 1160 megawatt electric power plant is located at the Stoney Reservoir near Mount Storm, West Virginia (Exhibit 123). Native vegetation in the area displayed symptoms of sulfur dioxide injury such as needle tip burn (Exhibit 124), short needle (Exhibit 125), and injury to the broad leaves (Exhibit 126). The degree of growth abnormalities in Scotch Pine decreased with increasing distance from the coal-burning power plant. Healthy Scotch Pine that was moved to a contaminated plantation near the power plant developed some injury and diseased trees moved to a healthy plantation showed some recovery. Plants were exposed to ambient air or carbon-filtered air at two sites in the Mount Storm area. Sensitive plants were injured and their growth suppressed only when exposed to ambient air (Exhibit 127).

Branches (Scions) from Scotch Pine trees grown near the power plant showed short needle (Exhibit 128); when grafted to healthy trees in a clean area, the new growth was normal (Exhibit 129). When normal scions were transplanted to unhealthy trees in a plantation where many trees suffered from air pollutant injury, they developed short needle and tip injury symptoms. Table II (Exhibit 130) illustrates that hourly peak concentrations of sulfur dioxide ranged from 0.0 to 0.36 ppm at the tree plantation site. Concentration of .01 ppm sulfur dioxide or above occurred 20 to 29 percent of the time at the three sampling sites. The hourly ozone and nitrogen oxide peaks at the three locations in Mount Storm ranged from 0.0 to 0.15 ppm and 0.0 to .08, respectively. Therefore, sufficient amounts of sulfur and nitrogen oxide were present independently or possibly synergistically to cause the damage that occurred in the Mount Storm plantations.

In 1975, I exposed Scotch Pine and a broad leaf plant (bush bean) to low pH acid mist and found that short needles and classical SO_2 and acid mist injury developed on the leaves (Exhibits 131 and 132). The injury was typical of that occurring on plants grown at the Mount Storm plantation.

In my opinion the injury on the broad leaves and the abnormal growth on Scotch Pine was produced from intermittent or continuous level of SO_2, NO_2 and HF emitted from the coal-fired plants.

In the Cumberland Study, Hindawi (11) surveyed the effects of Toronto power plant emissions on vegetation. The Toronto power plant (Exhibit 133) is located directly across 1/2 mile width of Ohio River from the southern edge of New Cumberland, West Virginia. Pollutants emitting from the stacks are primarily particulate matter, sulfur dioxide and nitrogen dioxide. Emission of particulate matter and sulfur dioxide from the Toronto power plant were estimated at 7,000 and 23,500 tons, respectively for 1968 (12).

Indigenous vegetation was inspected for damage by air contaminants. Severe damage attributed to sulfur dioxide was found on Forsythia (Exhibit 134), Maple (Exhibit 135) and Climbing Rose (Exhibit 136). Classical acid mist injury also was found on beet leaf (Exhibit 137) grown across the Ohio River from the Toronto Power Plant. Various sensitive plant species were placed in two separate greenhouses at the New Cumberland Post Office. In one greenhouse all incoming gases in the air were filtered to remove the phytotoxic gases. Unfiltered ambient air was flowed into the other greenhouse 24 hours a day. Table III (Exhibit 138) shows growth suppression of plants grown in the ambient air as opposed to those in charcoal-filtered air.

In my opinion the injury that developed on plants grown in New Cumberland could be attributed to sulfur dioxide and ozone individually or collectively.

The combination of ozone and sulfur dioxide reduces the injury threshold of the leaf tissue and increases the damage beyond that from the individual pollutants. Combination of sulfur dioxide and ozone occurred frequently at the New Cumberland Post Office during the study period. The annual mean sulfur dioxide concentration at New Cumberland was 0.05 ppm. This exceeds the criteria listed for average injury to vegetation (0.03) and for adverse health effects (0.04). Dust was observed on leaves of several plant varieties grown in Cumberland across the Ohio River from Toronto power plant. Settle dust in combination with dew form a relatively thick crust on the leaf surface. This crust cut off sunlight, reduced photosynthesis process, and therefore reduced formation of food production.

A study in West Germany (13) has shown that 70 percent of the SO_2 emitted from power plant stacks is oxidized to SO_3 within minutes. The trioxide continues to form in the atmosphere, and as the combustion products mix with atmospheric moisture sulfur acid is produced (14 and 15). This acid may be suspended as small droplets, which cause distinct punctuate spots to appear on leaves. Most often, acid aerosol damage occurs during foggy weather and the injury develops on non-waxy leaves. This type of spotted injury has been reported in Mount Storm, West Virginia, Maryland and in Cumberland across the Ohio River from the Toronto Power Plant (11). Increased acid input upset mineral equilibrium of soil and could cause leaching of calcium and other nutrient minerals from plant foliage; the leaves do not develop normally, and often have a wrinkled appearance.

Increased acidification of all forms of precipitation has received the greatest attention in the Scandinavian countries where more than 75 percent of all airborne sulfur is due to human activity. The result of extensive pH and SO_2 measurement over large land areas shows in some cases 200 fold increase in rainfall activity since 1956. Rain pH as low as 2.8 has been recorded in Sweden (16). Recent information (17) indicated that stronger acid has been observed in rain and snow in the Northern United States, with a single pH value as low as 2.1.

In conclusion, power plant emissions are known to adversely affect health and welfare. These emissions appear to be a major causal agent affecting vegetation. Low concentrations of sulfur dioxide can interfere with plant growth and functioning without leaving visible injury. This injury may interfere with or reduce photosynthesis. Grain crops may suffer a reduced yield, especially if crops experience SO_2 damage at the blossom stage. Injury to agricultural crops exposed to a given concentration of sulfur dioxide is greater than the injury to laboratory-exposed plants subjected to the same concentration. This is caused by additional toxicants present in the uncontrolled ambient atmosphere. A severe fumigation of sulfur dioxide and acid mist at the proper time could so weaken valuable trees that they would not survive the winter.

Finally, as a result of the increasing construction of new power plants, the use of high sulfur coal, and increased sulfur dioxide emissions from the stacks, SO_2 and acid mist in the United States will continue at current or higher levels (low pH) unless improvements in SO_2 controls are achieved.

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HEARINGS EXAMINER: You may cross-examine, Mr. Peterson.

MR. PETERSON: For the purpose of the record, I don't know whether or not that the photographs that were attached to the statement were ever marked specifically as exhibits. They were referred to as figures, and so forth, to the statement. I assume that's enough clarity for the Hearings Examiner; it's enough for me.

EXAMINATION OF DR. IBRAHIM JOSEPH HINDAWI

Cross, by Department of Natural Resources and Conservation

By Mr. Peterson:

Q Dr. Hindawi, what is your present employment?

A I am a scientist with the Environmental Protection Agency.

Q You appear here today on behalf of the Environmental Protection Agency or as a private consultant?

A No, as a -- I was called by Montana Department of Natural Resources to give talk about the vegetation affects of coal-fired plants.

Q Who called you, sir?

A Mr. Shenker.

Q When was this?

A This was early in the summer of 1975.

Q Are you receiving any compensation for your testimony here today?

A No.

Q Have you ever visited Colstrip, Montana?

A No.

Q What is the Montana one-hour standard for sulfur dioxide?

A I have no idea. I am talking now as a scientist who expresses his findings in the field and in the lab about the affect of SO_2 on vegetation.

Q Now, what factors do you consider to be important in considering the affects of SO_2 on vegetation?

A Mainly the SO_2 and the acid mist and the fly ash that comes from the stack.

Q Do you think that the factors would include the sensitivity of the species to the specific effluent?

A Well, if we talk about the existence and susceptibility of vegetation, this is definitely dependant upon the species and the time of the year and the stage of the plant growth.

Q Would it also involve the time of exposure or dose?

A Yes, definitely; it is involved.

Q And, of course, we would also amplify on the time of the year to determine what the relative humidity of the air is at the time of concentration?

A Absolutely. This is what I mentioned. Environmental condition means light intensity, temperature, humidity, and so forth.

Q Time of day?

A Time of the day.

Q How about soil condition, sir?

A Soil condition, too, does affect the sensitivity of plant and that of vegetation exposed to SO_2 and acid mist.

Q Dr. Hindawi, do you subscribe to the view that factors affecting plant sensitivity to the sulfur dioxide, indicate that plants grown under conditions of low soil moisture and low humidity are much less susceptible to sulfur dioxide damage than those grown under moist conditions?

A Right, exactly.

Q In reviewing your statement, Dr. Hindawi, I was interested to note in there a number of species to which you relate both in your test and in your tables. Do you know whether or not any of those species are indigenous to the Colstrip area?

A I don't know. I have no idea. As I mentioned, I have not visited the location.

Q I understand that, sir. I was wondering whether or not you have ever read any documents done by any researchers in the Colstrip area relative to the type of plants or vegetation that exist there?

A No, I have not.

Q And may I therefore conclude that your entire statement is not written as to whether or not the Colstrip plants will, in fact, cause any damage or injury to any of the plants in the Colstrip area?

A My statement is general. It doesn't involve one location in the United States, but involves any location or any vegetation in any location exposed to SO_2, acid mist and the fly ash.

Q But that location which may be affected by the SO_2, or the fly ash, or the acid mist, depends, does it not, on the type of the effluent or the concentration of the effluent to the species.

A Absolutely, this is correct.

Q And, do you feel, sir, that the federal secondary standard is adequate to protect those species?

A I have nothing to do with the standards.

Q You've read the criteria, Doctor?

A I am talking as a scientist. I am not involved. EPA did not call me to set the standards, but as I know, the standard could be changed; depends on the scientific accomplishment in the lab and in the field.

Q Do you think the federal secondary standard was set with scientific data?

A Absolutely, absolutely.

Q And you've read, I assume, chapter 5 of the criteria document?

A No, I have not.

Q You have not?

A Because I'm not involved in this.

Q Alright, I just want to get a little background in what you have done relative to your work with EPA.

A I mentioned and I stated that I am only as a scientist doing my work in the field and in the lab. I have nothing to do with setting the standards.

Q With regard to your statement, Dr. Hindawi, on page 4 -- you have your statement in front of you, I see.

A Yes.

Q The Table 1 is taken from what source?

A Table 1, as you see, this is from the USDA, Dr. Menser and Dr. Heggestad. They did some ozone and sulfur dioxide study, as we called it scientifically, synergistic action. This shows that two pollutants could damage vegetation and one pollutant -- one pollutant alone, at the same concentration, does not affect vegetation.

Q I understand that you're discussing the synergistic affects on a tobacco plant. Let me ask you this, is that tobacco plant a highly sensitive plant?

A Yes, it is W_3. Tobacco W_3, it is sensitive and used in the lab and in the field as an indication of air pollution.

Q And is the Bel W_3 species of tobacco one of the most sensitive of the tobacco family?

A This is true; right.

Q And, of course, you are not equating, are you, the effect on that type of tobacco plant to any type of plants which are indigenous to the Colstrip area?

A No, definitely not; only to tobacco W_3 as I stated in this.

Q Now, with regard, Dr. Hindawi, to a few of the field activities that you have engaged in in your career; you have been in, I understand, the Mt. Storm area?

A Right, correct.

Q And, was this at the time you were with EPA?

A Right.

Q How long have you been with EPA, since 1959?

A Seventeen -- this is my seventeenth year. Since 1959, as a commissioned officer. This used to be HEW and now EPA.

Q Were you born in Utah?

A No, I was born in Bagdad, Iraq.

Q I see. And when --

A I came to the United States in 1947. I graduated from Salt Lake City with a Ph.D. in plant anatomy and human genetics.

Q Okay. Did you come to the United States for the purpose of education?

A Yes, exactly.

Q And you've been here ever since?

A Right.

Q Now, Dr. Hindawi, with regard to the Mt. Storm study, you mentioned that, in your opinion, air pollution events occurred in 1970, 71 and 72?

A Right. This is my visit into the Mt. Storm --

Q Okay, that was what I was going to get at. Were air pollutants present when you were in the field at that time?

A In 1970, 1971 and 1972; yes.

Q And how much time did you spend in the area?

A Well, I think I made about 6-7 visits, and I did spend, maybe, 2 or 3 days each visit I been in Mt. Storm.

Q Did you measure the concentrations of SO_2 at these particular field sites?

A No.

Q Do you know what the ozone background was at that site?

A Well, the ozone, as I know it now, was 15 parts per hundred million.

Q That's high, isn't it?

A Definitely. It is high.

Q That's much higher and .3 parts per million, isn't it?

A No, 15 parts per hundred million means .15 parts per million.

Q Now, Dr. Hindawi, did you examine the entire region around Mt. Storm Plant?

A Well, I have a few location sites.

Q And you concentrated your efforts around those specific sites?

A Absolutely.

Q And this would have been over this 3-year period in about 6 or 7 visits?

A Yes, that's true.

Q What species were you examining?

A Mainly Scotch Pine or Christmas tree plantation. When I say Scotch Pine, this is involved French, Spanish, Scotch and Australian Pine.

Q Are there any Ponderosa Pine in the area?

A No, just White pines besides Christmas tree plantation. We have Scotch Pine and White Pine.

Q How did you undertake to examine the species; what was your procedure?

A Well, if I see the damage, I take some samples with me to the lab.

Q May I stop you there for a minute?

A Sure.

Q When you say, "if I see the damage," do you mean when you see the damage by eyeballing the damage?

A I see the damage by eyeballing and then I take sample with me to the lab and I do some chemical analysis and microscopic analysis. And then I evaluate the damage.

Q What percentage of leaf injury did you note?

A This would depend on the plant and depend on the needle. Each needle has a specific type of damage.

Q How many samples did you take, sir?

A Well, I have so many.

Q Hundreds?

A Sometimes even more than hundred.

Q Were those random selections?

A Absolutely.

Q And what did you determine as to the injury; what were your results of your laboratory tests?

A Well, one, tip damage; secondly, sulfuric accumulation in the tissue of the plant.

Q Were you assessing the --

A Fluoride or microscopic sectioning. As you know, SO_2 does affect the type of -- specific type of tissue on the needle; ozone affects other types; fluoride affects other types. By looking at the section under the microscope, one can tell what the cause of the damage affecting the needle.

Q Do you consider that eyeballing these species to determine their injury is a scientifically approved method?

A No. I mentioned, I believe, not only eyeballing, but sectioning and chemical analysis.

Q I understand that; but I am separating the three stages out. Is eyeballing self-sufficient?

A No, it is not.

Q Now, as I understand your testimony, with regard to the Mt. Storm area, that involves, as far as the concentrations were concerned, you were dealing there with some power plants that were emitting about 788,000 tons of SO_2 a year?

A Right.

Q They must have been burning fairly high sulfur coal?

A This is -- I don't know. This is EPA evaluation. I haven't done this.

Q Do you know what the projected or the predicted emissions are for the Colstrip plants, units 1 - 4?

A I tell you -- no, I don't know. We talk about practically, I would like to add this about Mt. Storm. As I've been told by EPA engineer that the emission varies between day and night, and I don't know why.

Q Actually, the only important thing, really, is the concentration, anyway, at the ground level; isn't it?

A Yes, this is true.

Q And, of course, that depends on atmospheric dispersion, and so forth?

A Exactly.

Q Now, did you, in your survey of the Mt. Storm area, ever find any damage to the White Scotch Pine trees by insect or mite damage?

A Yes, we do have. You can expect damage by insects or fungus even in your yard and even in mine. But this is not the principal of damage in Mt. Storm.

Q This is not what?

A This is not the principal. The principal damage is the air pollution, as I see it.

Q Okay, that's your opinion?

A Absolutely, and based on scientifical studies.

Q Were there individuals who took another approach, who made another opinion?

A Yes, definitely.

Q And they related the injury or the damage to insects or mites or fungus or wind or frost; things of that nature?

A And air pollution, too.

Q And some air pollution?

A Yes.

Q We have to be careful, don't we, Dr. Hindawi, when we're talking about the affects of air pollution on plants, to separate injury from damage?

A This is true.

Q You can have injury to a plant but not necessarily mean that you are going to have any damage to it?

A Right; this is correct.

Q Now, as I understand that Mt. Storm study, there was some form of a fumigation of one of the areas by reason of a hurricane; is that correct?

A Fumigation of what?

Q Of part of the area by reason of a hurricane and not as an ecological circumstance?

A Oh, yes, this was hurricane Agnes in 1972.

Q What was the extent of the winds of that hurricane in that area?

A I believe the wind, as I called the weather bureau, was south and southwest.

Q And, do you know what the velocity was?

A No, I have no idea.

Q Did you find evidence of injury to plant species in the path of that wind direction?

A That's true.

Q Did you find evidence of damage?

A No, I found only injury.

Q Okay, thank you, sir. Now, who were some of the other individuals who were connected with that study?

A We have, I believe, many people. One of them is Dr. Anderson, an entomologist at Duke. He was hired by Environmental Protection Agency and he did extensive study in Mt. Storm. And I believe he did publish his study. And one of his findings or his conclusions, that the insect might -- or adult plant diseases has nothing to do with the damage that he found in Mt. Storm, which is mainly air pollution then.

Q Did he find actual damage to the species or just injuries?

A No, he found damage and injury at the same time.

Q Do you know a person who worked on that project by the name of Dr. Morris Katz?

A No, I don't know.

Q Do you know Dr. --

A I know him, but I don't know if he did the study in Mt. Storm.

Q What do you know about him?

A I know he is a well-known scientist in this field of SO_2 and other air pollutants.

Q Is he fairly well respected?

A Yes.

Q How about a Dr. Leonard Weinestein?

A Yes, I heard him at the symposium meeting in Boston. And this man, he mentioned mainly the damage in Mt. Storm due to ozone or three -- but he didn't show and he didn't have any evidence to indicate the damage cause to ozone alone.

Q The symposium, was that the one in June this last year?

A Correct.

Q And did you also listen, at that time, to Dr. Wood and Dr. Pennypacker?

A Yes, I did, to Wood.

Q Did he give the paper?

A Yes, he did.

Q And were there papers given by Dr. Gordon?

A Yes, correct.

Q Is this the area that you listened to?

A Exactly, I listened to both of them -- to three of them, including Weinestein.

Q How was the Wood paper accepted by the group?

A Well, only I'd like to orient the audience and for the record, Dr. Wood was hired by Voytko power plant.

Q Yes, I know. I understand that.

A Yes, we know but we have to have it in the --

Q It will be in there later on.

A And this man, he tried to confuse or to mention, as you suggested, that the insect involved in the damage in the Christmas tree in Mt. Storm.

Q But he did find some air pollution injury, in addition, did he not?

A Yes, he did.

Q Now, with regard to your study in the Cumberland Study, I'm a little bit confused as to the nature of the air near Cumberland in West Virginia, because your statement, on page 6 says that the emissions of particulate matter and sulfur dioxide came from the Toronto power plant source. Are you following me there, Dr. Hindawi?

A What --

Q On the bottom of the statement, bottom of page 6, sir?

A No, the bottom on page 6 is Mt. Storm. This is not the --

Q This is the Cumberland Study.

A What line?

Q My question to you, Dr. Hindawi, is that I was a little bit confused from reading the statement, as to the nature of the source of the emissions for particulate matter and SO_2.

A I don't believe this is page 6.

Q Maybe you and I have a different statement. This is the one that was given to me. Let me read it to you --

A Oh, you have this one.

Q Don't you have your statement there?

A Yes, I do.

Q That's it. Now go to page 6, Doctor. Okay, at the bottom of the page, you say that when you were doing your study there, that you relate the emissions to a Toronto power plant?

A Right.

Q Do you see that?

A Yes, I do, now.

Q Well, I have had an experience of being in that area, and I'm wondering if the picture that you've shown us here today as part of your testimony, which you relate as Figure E, Doctor; that's the photograph that you took?

A This is the --

Q And that's the Toronto power plant?

A The Toronto power plant on Ohio River polluting West Virginia. May we expose this --

Q Well, let me follow up here. My question really is, when I was there, I noticed there were a lot of other plants in the area; and I think I can even see one in your photograph here.

A What do you mean; another power plant?

Q I don't know what it is here, the stack down here that's --

A This is only one Toronto power plant. I believe this is open fire.

Q Right. My question is whether or not there are any other industrial sources of emissions, of SO_2 and particulate matter, in or around the Toronto power plant?

A Well, you do have a Stemuville Willing, which is --

Q Can you spell that name for the reporter?

A I think I can. S-t-e-m-u-v-i-l-l-e W-i-l-l-i-n-g.

Q Does the Federal Paper Board Company have a plant near this Toronto plant?

A I have no idea.

Q There is the Willing steel plant?

A Right. This is true.

Q And how about the Toronto Paper Board Company; do they have a plant near that area?

A I have no idea.

Q Or the Toston power plant; do you know where that is located?

A No.

Q Do you think that any of those other industrial sources would contribute to the emissions?

A Could be nitrogen oxide and particulate.

Q You wouldn't be able to rule that out?

A No, definitely not.

Q So it is a matter for the Board of Natural Resources in this proceeding, actually, your statement where you say that emissions of particulate matter and sulfur dioxide from the Toronto power plant; that is only one source?

A This is exactly right.

Q And there are other sources?

A By the way, this is one source close to New Cumberland, and we are studying this specific source and this specific location in New Cumberland.

Q Now, with regard to your study at Cumberland, as I understand it, that was -- you set up a greenhouse in the post office there?

A This is true.

Q And then you took measurements; over what period of time?

A During the summer; during the study period.

Q Did you measure the relative humidity of the area?

A No.

Q Would that have been important at all?

A Oh, it definitely does affect plants.

Q What kind of species were you dealing with?

A We used tobacco W_3; we used pinto bean; we used Petunia and the gladiolus.

Q Those are all listed in your Table 3 attached to your statement?

A Right.

Q Do you know whether any of those vegetation species are found in or about Colstrip?

A No, I don't know.

Q You don't know whether we grow tobacco down there or not?

A No, definitely not. I've never been, as we mentioned.

Q How about cotton; do you think we grow cotton down there?

A No.

Q Now, those investigations were taken in the year 1968?

A This is true.

Q Did you continue with them after that time?

A No, just the --

Q And how many days did you spend in the area at the greenhouse while you were conducting your investigations?

A Well, I do have one technician who stayed all the time, and I used to visit this location a few times every two or three weeks.

Q Did you make any determination as to the proportion of the dust on leaves in Cumberland, which came from the power plant, as opposed to what may have come from local sources?

A No, I did not.

Q Would you concede that there might have been some dust come from local sources?

A Could be, definitely.

Q Did a thick crust occur on these leaves, specifically, did you find?

A Yes, I did.

Q And how thick was the crust?

A Well it was thick enough to cut down the light intensity and reduce the photosynthesis, and this means scientifically, cut down the food and seed production.

Q Okay, now, by how much was the photosynthesis decreased; did you measure that?

A No, I did not.

Q Has the power plant undertaken design changes since this time to alleviate the dust problem?

A I have no idea.

Q You don't know whether or not they put in any pollution control or abatement equipment?

A I have no idea, now.

Q Have you ever been back to the area since 1968?

A No.

Q How many years has the plant been operating -- or how many years had the plant been operating prior to 1968; do you know?

A No, I don't.

Q Now, with regard to your sunrising of your research in West Germany; were you ever in West Germany?

A No.

Q This is a literature research?

A This is literature and I have the soil solubilities over there.

Q Do you know whether or not the power plant in that instance was oil-fired rather than coal-fired?

A Well, when we say this is in Germany, we mean all the industrial activity, including the power plant. This could be some of the emissions coming from England, from London.

Q Do you know whether that's from coal or oil?

A I have no idea.

Q Would it make a difference to you?

A Well, it does if I'm going to do the study thoroughly.

Q Now, do you know the megawatt power production capacity?

A No, I don't know it.

Q In what years was this study done; that is, what years were the observations made?

A I am only quoting other people, other publications; this is not mine.

Q Do you remember, in reading the publication, what year they did the study?

A I believe 1970, '71, '72.

Q Do you know whether or not any of the power plant sources contained air pollution equipment?

A I have no idea.

Q Now, also on page 8 of your statement, you mention that recent informations indicates that stronger acid has been observed in rain and snow in northern United States --

A This is correct.

Q -- with a single pH value of 2.1?

A Right, this is correct.

Q And your source of information, there, is Likens and Bormann?

A Exactly.

Q Are they considered reputable in this field?

A Well, he is well-known in this field at Cornell University. He is an authority in acid mist and SO_2.

Q Was it, in fact, this particular publication by Likens and Bormann, related to the northeastern part of the United

States; particularly, New England and New York?

A Right, exactly.

Q And, would you also concede that that was not the average pH, approximately 4.0, rather than the two extreme numbers that you cited?

A Well, you do have 2.1, as I say; but the average could be 4, could be 5, could be 6.

Q Do you remember what it was, Doctor?

A No, I have no idea.

Q Would that make a difference?

A Oh, definitely, because the lower the pH, the more damage on vegetation and the environment.

Q Would you concede that the conclusions with regard to acid rain or acid mist have become more applicable to areas which are humid than to semi-arid climates?

A Well, we mentioned it depends on the environmental conditions, wind, temperature, light, and so forth; definitely. Yes, we did mention this.

Q And one of the keys as to whether or not the area or the atmosphere contains a relatively high degree of moisture?

A This is true. We have to have high humidity.

Q In order to create the acid mist?

A Acid mist, right.

Q And when you say high, what range of rainfall are you speaking about?

A Over fifty.

Q Over fifty inches a year?

A No, we mean the humidity, 50 percent, or higher.

Q Does it relate to the -- does the relative humidity relate to the amount of rainfall at all?

A It depends; sometimes it does, sometimes it doesn't.

Q Is it usually found in areas where we have large bodies of water?

A Yes, this is one of the causes, maybe.

Q Do you know whether or not, Dr. Hindawi, the plant species in the Colstrip area, are no more sensitive, and in a large majority of the cases, extremely more resistant to sulfur dioxide than alfalfa and barley?

A I have not studied the variety of the plant; but I do know alfalfa is sensitive -- more sensitive to SO_2 and acid mist than any other indigenous vegetation.

Q Alfalfa and barley are?

A Right, absolutely. And this is, by the way, published by the American Smelting and Refining Company and Dr. Thomasman. (?)

Q One other matter. On page 7 of your statement, Dr. Hindawi, I would like to know as to the values which you have reported on the third principal paragraph of that statement. You said that the annual mean sulfur dioxide concentration at New Cumberland was 0.05 parts per million?

A Yes.

Q This exceeds the criteria listed for average injury to vegetation of 0.03 and for adverse health effects of 0.04.

A Right.

Q What criterias are those?

A By -- this is published in publication by the Environmental Protection Agency at that time of the study. I am talking of what EPA have --

Q Is that in their criteria, Doctor?

A It seems to me, yes.

Q And, that is the criteria you speak of at that point?

A This is what they have in the EPA publication.

Q Have you ever written a publication that the plant injury threshold for sulfur dioxide is .3 parts per million for eight hours?

A Yes.

Q Do you still believe that?

A Absolutely. It depends on the vegetation. When we say .3 parts per million SO_2, what vegetation, and what time of the year, what humidity, and what light intensity, and so forth.

Q I don't know. In reading the document that you yourself authored; the way I read it, you were talking about the plant injury threshold --

A This is true.

Q And I don't see anything in there whereby you related it to any specific plant. I was assuming, therefore, that the threshold for .3 parts per million for eight hours would be applicable to most plant species?

A Exactly, this is true.

Q And that's a fair interpretation?

A Yes.

Q Okay. Now, with regard to the 0.03 parts per million; how does that relate, then, to your statement of 0.3 parts per million during the eight hour period; are they different criteria?

A This is -- my publication or my statement has nothing to do with the criteria. This is what I say. We are talking scientist -- only scientific effect; it has nothing to do with other people's publications.

Q Which one do you subscribe to?

A Which one?

Q Yes, the 0.3 parts per million for eight hours --

A The 0.3 is really enough or higher even than the concentration to cause damage on vegetation. By the way, even in Mt. Storm we didn't even find this high, and yet we have severe damage on the Christmas tree plantation. It doesn't have to be 0.3; lower than 0.3 parts per million could cause severe damage on vegetation.

Q How low?

A Depends again; depends on the environmental condition, stage of the growth, time of the day, and so forth.

Q So there is no magic number?

A No, definitely not.

Q That's what you're saying?

A This is the way I feel.

Q Do you concede that the lower the concentration, the less likely there is to be injury or damage?

A The lower the concentration, definitely, the lower the damage. And this, again, depends on the environmental conditions. It could be when we have lower concentrations just the right time. We can say this; if you do expose the plant at the flower stage, even with low concentration, one can detect damage. If you expose a plant at the late stage of the growth, even with high concentration, you don't expect to see too much damage.

Q And would that be applicable to grasses also?

A Yes, correct.

Q They, however, are not as susceptible to damage, are they, than plant life -- most plant species, house plants, and so forth?

A Can you repeat your question?

Q Are the range grasses more susceptible to damage than the plants?

A Well, we can say this: The plant outside in the field becomes more susceptible to air pollution than the plant inside or in the house or in the greenhouses, because a plant in the field is exposed to the natural environmental conditions. And I would like to add this, scientifically, because the plant exposed in the field could be exposed to more than one pollutant; could be exposed, as we say, for example, to SO_2 and nitrogen oxide or SO_2 and ozone, or SO_2 and fluoride; then a plant becomes more susceptible and this is what we call early synergistic action.

Q When they become susceptible, do they necessarily cause damage?

A No, it does not necessarily.

Q Do you know, Dr. Hindawi, with regard to the two values you cited on page 7, the 0.03 and 0.04 parts per million, who established these numbers?

A This is on page 7?

Q Yes, sir. We were just talking about it.

A This is the EPA or HEW at that time, in 1968.

Q Do you know what evidence was used to establish those values?

A Well, this is, as we mentioned earlier, dependant on the field study and lab study by scientists in the field of air pollution.

Q Are there other scientists, that you know of, who would agree or disagree this number should be higher or lower?

A I have no idea.

Q Alright. Would it be generally a good policy, insofar as you are concerned as a scientist, that in the design or construction of a power plant that the stack should be tall enough so that the dispersion is good?

A If you ask my opinion, I can say, the total stack you have; that means you take the air pollution, you take the acid mist, you take the SO_2 and move it from one location to another location; as I know now, people in Sweden and Norway, they try to sue England because they think the SO_2 and sulfur, and so forth, coming from England due to a high stack.

Q They haven't been successful, have they?

A I have no idea. But this is one thought of the high concentration of air pollution in Sweden and Norway.

Q Have you ever worked around a power plant area which contained sulfur dioxide air pollution equipment?

A I am not an engineer; I have nothing to do with it.

Q I understand you're not an engineer; I want to know, in your experience, whether or not you worked around an area where the power plant, in fact, operated with air pollution control equipment?

A No, I have not.

Q What's the purpose of having air pollution control equipment?

A To cut down the emissions.

Q And why would we want to cut down the emissions?

A This is what we like to preserve the environment. We like to have a healthy environment.

Q This cutting down the emission, then, relates to the fact that you would find much less ground level concentrations which would affect the species?

A This is true.

Q Would you think that if we cut down the emissions well within the standards, that there would be less likelihood or no likelihood of damage?

A No, definitely less damage on vegetation and on the environment.

Q If we cut down the emissions to well below the standards?

A Yes, the lower the emission, the less damage on vegetation and the environment.

Q Okay, you and I agree; I didn't say it right. Thank you.

MR. PETERSON: And I think with that, Dr. Hindawi, that is all, and thank you, sir.

WITNESS: You're welcome.

HEARINGS EXAMINER: Redirect.

Redirect, by Department of Natural Resources and Conservation

By Mr. Sheridan:

Q Dr. Hindawi, when you observed what you attributed to be SO_2 damage or injury to Scotch Pine in Mt. Storm, did you later go back to your laboratory to replicate that?

A This is true; I did.

Q What success did you reach?

A The pH that I used in our lab and in the field facility is close to pH 4, caused the damage practically identical to that I found in Mt. Storm at the Christmas tree plantation.

Q And did you have mites and insects running around your test chambers at the lab, too?

A Well, you may expect to see mites in any plant, but it is not the cause of the damage, as we see it.

Q When you observe or inspect a needle or a tree for damage, are you readily able to observe whether or not mites or insects have damaged that tree?

A Yes, we, by the help of other scientists, as I mentioned earlier, we had with us Dr. Anderson, entomologist from Duke University, and his statement that mites have nothing to do with the damage in Mt. Storm.

Q I want to clarify one thing with respect to your testimony on synergistic reactions. Are you testifying that lower concentrations of pollutants acting in concert can cause more damage or just cause damage that would not otherwise be expected if the presence of only one pollutant were there?

A If one pollutant, and we have low concentration of that specific pollutant, we have lower damage. If we have two pollutants, even in low concentration, one might expect to see damage, as we call this synergistic action.

Q In other words, you may see no damage at a high concentration with one pollutant, for instance, SO_2?

A This is true.

Q But, then, if you have a very low concentration of SO_2 and a very low concentration of, say, O_3, you will observe damage?

A Definitely, we do see damage.

Q Even if both the O_3 and the SO_2 levels are below levels at which no damage was observed when they were independent of one another?

A This is true.

Q In your studies at Mt. Storm and your laboratory studies concerning the affects of acid rain, were you able to remove trees subject to acid rain from the area of damage and replant those trees in controlled areas; what observations did you make?

A In my study in Mt. Storm, I did take some scion or branches from contaminated location that showed damage by acid mist and SO_2.

Q This was the short/long needle syndrome?

A Right; and we grafted in a clean location, and we have to wait one solid year. At the end of the vegetation growth, we found the new growth intact without damage and we did the same thing. We took some clean branches or clean scion and grafted in the contaminated location, and we have found damage developed at the end of the vegetation growth. This is one indication that the damage is due to air contamination rather than to insects or mites or other means of entry.

Q Dr. Hindawi, you're called here today as a witness, not to address the question of standards, are you?

A Right.

Q You're called here rather to testify with respect to observations or damage or injury to plant species that you have observed as a result of exposure to SO_2, O_3, or other pollutants; correct?

A This is true.

Q In your studies around Mt. Storm, or anywhere else, as a scientist, do you believe that it is a scientific method to go around the area making visual observations, failing to subject the species to chemical examination, histological examination or infrared examination?

A Well, only I can say, in my study in Mt. Storm, when I took the samples, I took them with me to the lab; and for, not only one or two or three days, few weeks, and then I decided or I evaluated the specific damage that developed on the plant. It is not enough to drive around the plantation and you give your evaluation to the specific damage and otherwise.

Q When you subject a pine needle or a conifer needle to histological examination, are you able to determine or distinguish between the affects of hydrogen chloride gas or SO_2 gas on that needle?

A Yes.

Q How do you do that?

A Well, you do it microscopically, because the SO_2 mainly affect the spongy cells and the fluoride affect the palisade and the spongy cell and the epidermis. I am saying this; this is the tissue that we know to build the structure of the leaf.

Q And have you compared the histological finding on field samples to those subjects of examination in your laboratory?

A Practically identical; the same thing.

Q Have you published on that?

A I did give a presentation at the APCA meeting in Denver, but now I am still doing this; I am more work doing, or more work now at this moment at Corvallis. At the end of the study I will publish all the SO_2 and acid mist with respect to Christmas tree plantation.

Q And just so we're clear here, it was not your purpose to come and tell us about what the conditions are at Colstrip, now, was it?

A This is true.

Q Your purpose is to explain as a scientist the fact that you have determined that damage to conifer species or other botanical species occurs as a result of exposure to SO_2, O_3, NO_x or HF; is that right?

A Right, correct.

Q And that damage may be observed even below existing established standards?

A Could be.

MR. SHERIDAN: I have nothing further. Thank you.

Re-cross, by Applicants

By Mr. Peterson:

Q Dr. Hindawi, let's go back to your laboratory work that you took on the Scotch Pine.

A Right.

Q What was the concentration of SO_2 that you used in that lab work?

A I did expose Scotch Pine to acid mist, pH_2, pH_4 and $pH_{6.7}$.

Q And for what period of time?

A This is prior to the break of the dormancy and after the break of the dormancy, 4 weeks and 8 weeks.

Q And what was the moisture or soil conditions?

A The high humidity.

Q How high?

A I don't know.

Q Over 80 percent?

A I have no idea.

Q Have you ever found damage to vegetation from a combination of 0.03 parts per million of ozone and 0.09 parts per million of SO_2?

A No, I haven't done this in the lab. Only I am quoting other people that did this.

Q Have you ever known of an instance where those type of concentrations created any damage?

A Well, in my study to Staten Island in New York I have found Roselle, I believe, in New Jersey, which is across from Manhattan; the type of damage I found, and this is, by the way, published; the type of damage I found is not due to one pollutant. It is not due to SO_2 or ozone, but, in my opinion, due to both, a combination of both ozone and SO_2 in low concentrations.

Q What do you mean, low concentrations; can you give us a value?

A No, I cannot give you the value; but the way I see it, my estimation and evaluation, low concentration.

Q That's a relative term; it really is meaningless unless we know what measurement you're talking about.

A I have no idea how low.

MR. PETERSON: I have nothing else.

MR. SHERIDAN: Nothing further.

HEARINGS EXAMINER: Thank you, Doctor. You're excused and have a good trip home.

WITNESS: Thank you.

(Witness excused.)

MR. SHERIDAN: Mr. Hearings Examiner, we'll offer the admission of Exhibits 120 through 138 attached to Dr. Hindawi's statement.

MR. PETERSON: No objection.

HEARINGS EXAMINER: Very well. I would like the record to show on that that they will be admitted, but, I think, are those any pictures that you're referring to or are they part of the statement that was referred to?

MR. SHERIDAN: They are pictures associated with the statement.

HEARINGS EXAMINER: Now, the exhibits that you asked about in the statement are not marked separately as exhibits, are they; they're just part of the statement?

MR. PETERSON: They are tables.

HEARINGS EXAMINER: Fine. That will be included as part of the statement so the record is clear on that. Very well, thank you. I'd like to take some public witnesses now while we're waiting. Did you call Mr. Wickes to come over?

MR. SHERIDAN: Yes.

HEARINGS EXAMINER: Fine. While he's on his way over --

LYLE FONTAINE, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Please be seated. And I have already advised you that when you have a prepared written statement, you don't have to reread it into the record. It will be written and go to the Board, who are the decision makers in this; so that will save us having it reread and retranscribed, and then go to the Board in written form. You may add anything to the written statement you may wish to add, though. You told me that you had anticipated reading it and you had some other things that you wanted to add to it?

WITNESS: Yes.

HEARINGS EXAMINER: Go ahead and make your statement in supplementing it.

(THE WRITTEN DIRECT TESTIMONY OF MR. LYLE FONTAINE WAS DIRECTED TO BE INSERTED AT THIS POINT.)

I'm Lyle Fontaine, age 49, married and I have two children. My daughter Nancy is 12 years old and son James is 5 years old. I'm a carpenter and am now working for Bechtel on Unit 2 at Colstrip. I've been sawman in the carpenter shop now for two years. Been in the carpenter trade since I came out of the Navy after World War II.

I've lived in Rosebud County for most of my life. I can remember when the mine was going in the 30's and 40's for the railroads and also the closure of the mines in the 50's, and the close of the town of Colstrip.

I think the plants 3 and 4 should be built for the employment of all the trades. I've been a union carpenter for thirty years and I think it is a great help for the trade and there would be employment for at least 70 to 100 carpenters for five to six years. This would be a great deal for our young people to have this kind of employment. This means they can get new trailers and cars and also things they couldn't have got without it.

We also have an apprenticeship program going. Every hour the carpenters work there is two cents that goes into this program to teach more young people in the trade.

I think these plants should be built on the standards of all the clean air laws. We have a State Board of Health and I think these plants must live up to the standards of this Department of State. If not, they should be shut down until they meet these requirements.

Again, if plants 3 and 4 are built this will mean money for those working to help put their children in good schools and colleges.

Before I came up here, I talk to Jim Rogers, Job Superintendent for Montana Power. He told me that if 3 and 4 are to be built there would be at the peak of employment around 1500 people working there. With this many jobs it helps all business and brings in more employment such as more housing for the worker, also, he said more new trailer courts to be built which will also have to meet the state health standards. Also, these people have new ball parks, new tennis courts already built.

At my home town of Forsyth, it also has helped the town in building. One, a new Super Market, two, a new Heberle Ford garage. We also have a new hospital. We have three doctors now. Also we have a new Senior Citizens building. Three new apartment houses. I sure hope to see these plants go for it would be a sad looking town without a payroll like Colstrip.

So with the hope of plants 3 and 4 being built, the employment in Eastern Montana will look good and in all the time I've been in carpenter work. Working on plants 1 and 2 is the longest job I have ever had. This is real good for it means your with your family every night and not much traveling.

I want to thank Mr. Davis and the Board for their time. Thank you.

ORAL SUPPLEMENT TO WRITTEN STATEMENT BY LYLE FONTAINE

I'm Lyle Fontaine and I live in Forsyth; and this written statement is here. And I don't think I got it in the statement that this kind of employment that 3 and 4 is anticipating in our county keeps our young people at home, where they don't have to travel out of our county and out of our state for employment. That's what I'd like to add into this.

EXAMINATION OF LYLE FONTAINE

Cross, by Department of Natural Resources and Conservation

By Mr. Sheridan:

Q Sir, do you have any idea how long that employment will last after 3 and 4 are constructed, assuming 3 and 4 are allowed to proceed?

A I do not, but I talked to the plant manager up there and he said, if 3 and 4 goes, it would be 5 to 6 years.

Q You don't really have any idea, beyond that, how long jobs like that are going to be available for carpenters?

A No, construction work is pretty hard to participate in areas.

Q Construction workers generally have to go where the jobs are?

A That's right.

Q And they would like to have jobs in Rosebud County for now, right?

A That's right. It's real nice to be home with your family every night, because I've been in the trade for thirty years and this job that I'm on right now on units 1 and 2, I've been on it for two years. That's the longest I've been with my family in any one job.

MR. SHERIDAN: Fine. I don't have anything further.

HEARINGS EXAMINER: Mr. Meloy? Very well, sir. Your statement will go to the members of the Board and thank you.

(Witness excused.)

HEARINGS EXAMINER: Next gentleman.

EARL CHARETTE, appearing as a public witness, having been first duly sworn upon his oath, was examined and testified as follows:

HEARINGS EXAMINER: Please be seated and proceed and make your statement.

STATEMENT OF EARL CHARETTE

My name is Earl Charette, and I've been living on the Cheyenne Reservation. I've been living there for 12 years. But I'm here to represent myself as a working man. I'm not here to put a plug in for the Indians. But I've been at Colstrip since approximately a month after it started, which is three years. Before that I was jumping from job to job, six months here, three months there; and before that, I was employed at the school -- the grade school. I was a carpenter there and I was making $80.00 a week, so I just couldn't live on it; I had to get on to school or find another job which wouldn't let me live a normal life or a life like I want to live and be comfortable. Now, with this job I feel I can live comfortable, and if 3 and 4 goes, I'll stay and work there. But if not, I'm going to have to pack up my family and leave. I've got a new home and I sure wouldn't want to leave that behind. I was raised in Montana, in Rosebud County. I'd sure like to raise my kids there; and my wife is from the Cheyenne Reservation. I know she doesn't want to move, and I don't want to leave. So, I'm hoping and trying to have 3 and 4 built so I can stay around and work.

HEARINGS EXAMINER: Mr. Sheridan.

EXAMINATION OF EARL CHARETTE

Cross, by Department of Natural Resources and Conservation

By Mr. Sheridan:

Q You are here as an individual and not on behalf of the Northern Cheyenne, correct?

A Yes, I am.

MR. SHERIDAN: I have nothing further.

HEARINGS EXAMINER: Mr. Meloy?

Cross, by Northern Cheyenne Tribe, Inc.

By Mr. Meloy:

Q I didn't get your last name, sir?

A It's Charette.

Q Are you a Cheyenne, sir?

A No, I am not.

Q What tribe are you?

A I'm a Chippewa.

Q You're a Chippewa. Do you know Mr. Waldon?

A Yes, I do.

Q Is he a member of the same tribe as you are?

A No, he's Cherokee.

Q Oh, he's a Cherokee.

A Yes, as far as -- I think; I'm not sure.

Q Was he the person who hired you originally?

A No, he's not.

Q Are you living in Lame Deer right now?

A Yes, I'm living five miles south of Lame Deer.

Q Five miles south of Lame Deer. Where did you receive your -- you say you're a carpenter?

A Yes, I am.

Q Where did you receive your training as a carpenter?

A It's called Indian Action Team in Ashland.

Q I'm sorry?

A The Indian Action Team, it's a trade school. It started in Ashland and now it's in Lame Deer.

Q How many carpenters who are also Indian are still working at the plant?

A That are still working at the plant?

Q Yes.

A I'd have to say there's at least ten.

Q Are they all Cheyenne's?

A No, Cheyenne, Crow, Sioux; myself, Chippewa.

Q They are all carpenters?

A Yes, there's at least 8 to 10 carpenters that are Indians still working there.

Q Is Larry Robinson -- do you know Larry Robinson?

A Yes, I do.

Q Friend of yours?

A He's an acquaintance; I went to school with him.

Q Oh, you went to school with him?

A Yes, I was a year ahead of him.

Q Did he finish school?

A Yes, he has.

Q This is the Indian Action Team school that we're talking about?

A Yes.

Q Do you know how many unemployed, able-bodied workers there are on the Northern Cheyenne Reservation?

A No, I don't. If you'll let us build 3 and 4, we'll put them to work.

Q Well, Mr. Robinson told us he thought there were about 1,200.

A That's the way he figured it. I don't know; I don't have the slightest idea.

Q When 1 and 2 were being built, how many Cheyenne's were put to work; do you know that?

A I've got to say there was at least -- at one time, you mean?

Q Yes.

A There was at least 50-60. I didn't look at no records; just guessing.

Q And right now -- do you know how many there are right now?

A Cheyenne's?

Q Yes.

A There's probably 20, 30.

Q And how many will there be after units 1 and 2 have been completed?

A I do not know.

Q Well, will there be any employment for you or Cheyenne's after 1 and 2 have been completed?

A There will be jobs for Montana Power; they are permanent jobs. I guess if we're qualified to get them, we can get them.

Q What kind of jobs would a carpenter be able to do, do you suppose?

A I don't know.

Q And if units 3 and 4 are built, that will give you another 4 or 5 year's worth of employment; right?

A Yes.

Q And then after that, what happens? Will you have to leave Lame Deer?

A I hope not.

Q Well, where else would you work?

A Go on welfare, I guess.

MR. MELOY: I have no other questions, Mr. Davis.

HEARINGS EXAMINER: Thank you, sir. One question I have as Hearings Examiner: Is your wife a member of the Northern Cheyenne Tribe?

WITNESS: Yes, she is.

HEARINGS EXAMINER: Thank you, sir for coming; and next gentleman.

(Witness excused.)

HOMER HARRIS, appearing as a public witness, having been first duly sworn upon his oath, was examined and testified as follows:

HEARINGS EXAMINER: Please be seated. You don't have a written statement, do you? Will you give the reporter your name so she can get it in the record properly? Just speak right into the mike.

STATEMENT OF HOMER HARRIS

My name is Homer Harris and I'm from the Cheyenne Reservation. I live between Lame Deer and Ashland. I was born and raised in this country, educated, and I taught two and a half years at the IAT school. And there was, at one time, in Colstrip; Mr. Charette didn't have the records, but there was 88 Indians hired and that had worked at Colstrip. I taught welding and general shop work. I'm a journeyman millwright; have been for thirty years. And, I educated 17 welders, Larry Robinson was one of them; he was a very good welder. All the boys I sent up there at Colstrip are all working and there was approximately 20 -- I think there was 22 boys that went on other jobs on the roads that they built on the reservation, and they're all using their education that they got at the IAT school; which was one of the greatest booms that ever hit the reservation. And it come just in time for Colstrip, for unit 1 and unit 2.

And I do hope that they build 3 and 4 for the surrounding countries right around the county so they can have some employment in southeastern Montana, because they never had that. About all they've ever done is picked up bails of hay for five cents and maybe went on a roundup or two twice a year. I had boys come in my class that were 26-30 years old that had never even been to Hardin, Montana. They lived at Busby, and that's only approximately 90 miles away. But today, with employment situations in southeastern Montana, they have a decent truck, they have decent clothes, and I do believe that there is a lot of people that go by Colstrip that think Montana has built a beautiful plant there. It is really a beautiful site when you drive through there. And I sure would like to see 3 and 4 go. And that's all I have to say.

HEARINGS EXAMINER: Mr. Sheridan.

EXAMINATION OF HOMER HARRIS

Cross, by Department of Natural Resources and Conservation

By Mr. Sheridan:

Q How did you get up here?

A I rode with a couple of companions from the job.

Q Anybody ask you to come up?

A No, sir.

Q Anybody agree to pay your expenses?

A No, sir.

Q Who are you employed by now?

A Bechtel.

Q The two fellows before you are also employed by Bechtel, right?

A I was employed by IAT, Indian Action school.

Q You'd just as soon keep your job at Bechtel, wouldn't you?

A You bet.

MR. SHERIDAN: Okay. I don't have anything further.

HEARINGS EXAMINER: Mr. Meloy.

Cross, by Northern Cheyenne Tribe, Inc.

By Mr. Meloy:

Q You said you were teaching at the Indian Action school?

A Yes, sir.

Q How long?

A Two and a half years.

Q Are you Cheyenne?

A Pardon?

Q Are you a Cheyenne?

A No, sir.

Q Two and a half years, and you said you put out 17 welders?

A Yes, sir.

Q They are all working at the units 1 and 2 right now?

A No.

Q How many?

A I think there's 12 left.

Q Twelve left?

A Yes.

Q Do you know what happened to the other five?

A They have taken other jobs.

Q In the area?

A No, I think there's one up at Bozeman and there's one working at the Mission at Ashland, and I'd really have to think about where the rest of them went; but they're all journeymen welders.

Q In two and a half years, 17 welders, does that seem like a lot of people to you?

A Yes, sir.

Q Why is that?

A Well, I have been with a lot of welders in my day, you might say; and when we first started that vocational school, why, the government told us if we got two percent and put them to work, we'd be doing very, very good. Because these boys here, they've all had a high school education, but they had never really picked up anything -- they couldn't even visualize -- in fact, they was afraid to pick up a welder; they thought they'd get shocked to death. And they were withdrawn. So it usually takes two years to make a good welder.

Q What was the age range among those people who could take your training; any age, did it make any difference?

A I would say the average age was close to 26 years old.

Q But there was no restriction on age, was there?

A No restriction; no, sir.

Q Do you know how many able-bodied men there are on the Cheyenne Reservation?

A I really do not.

Q Do you know how many of those are unemployed?

A No, I couldn't give you the exact number. All I know is that since Colstrip started, you have a lot of Indians that are working and they can see what can be done when everybody works together and puts something up.

Q And when you talk about a lot of Indians, that's a relative statement, right. I mean, a lot of Indians, if there are only 20 Indians on the Northern Cheyenne Reservation, then, 10 would be a lot -- 10 working, right?

A No, I wouldn't say that.

Q Oh, you wouldn't?

A No, sir.

Q You wouldn't say that half was a lot, if there were only 20

Indians on the Cheyenne Reservation and 10 of them were working; that isn't a lot?

A I want to see them all working.

Q Well, we all want to see them all working, don't we; but that's not the question. The question is, when you say there is a lot of Indians working, that is a relative statement and it depends upon how many there are that are able to work who aren't working. And if there are 1,200 who are able to work and not working, and only 10 are working, then is that a lot?

A No, that is not a lot.

Q Do you pay these people who went through the Indian Action Team program?

A They got paid $2.00 an hour to attend school; yes, sir.

MR. MELOY: I don't have any other questions, Mr. Davis.

HEARINGS EXAMINER: Very well, sir. Thank you very much for coming, and you're excused.

(Witness excused.)

MICHAEL L. MURPHY, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Please be seated. Mr. Murphy, your written statement will be received in evidence and go to the Board, and if there's anything you wish to add to it before cross-examination, you may, or -- you don't need to reread it into the record, though, because we type it and send it to the Board anyway.

WITNESS: No, that's fine. I have nothing further to say other than what's written.

(THE WRITTEN DIRECT TESTIMONY OF MICHAEL L. MURPHY WAS DIRECTED TO BE INSERTED AT THIS POINT.)

February 18, 1976

Rimrock Mall

TESTIMONY IN SUPPORT OF COLSTRIP 3 & 4

Presented to THE MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

By: Michael L. Murphy

Billings Associates

My name is Michael L. Murphy, and I am the General Manager of Rimrock Mall in Billings, Montana. Rimrock Mall is owned by Billings Associates, a limited partnership composed of Bruce D. Crippen, a Billings resident, and Ernest W. Hahn, Inc., of Hawthorne, California, who is also the General Contractor and Property Manager of the project. On September 11, 1975, Rimrock Mall became the largest regional enclosed shopping mall under one roof between Denver, Colorado; Calgary, Alberta; Fargo, North Dakota, and Spokane, Washington. As such, it is the largest such venture in the State of Montana and represents an owner investment of approximately $16 million with a matching dollar total from department stores and store interior construction within the enclosed mall. By including the cost of store fixtures and merchandise, it aggregates a $30 million investment in the Treasure State.

I am appearing here today in support of a Colstrip 3 & 4 project as the representative of that $30 million investment in the economic

300 South 24th Street W., Billings, Montana 59102, Phone (406) 656-3205

future of Montana and as an expert in regional shopping center development. By no means do I imply expertise in electrical engineering, land use or environmental protection. As owners and developers of Rimrock Mall, we are gratified with our reception in the Montana community. As a significant addition to private enterprise within the State, we hope to become thought of as good neighbors by paying a fair share of the tax burden while broadening its base, employing up to 1200 full and part-time employees throughout the year, and significantly contributing to the socio-economic culture within our defined trade area. Our own contribution towards land conservation comes by way of being the first major construction project in Yellowstone County to devote 15% of the parking lot area to natural landscaping. The concept of regional shopping center appeal is based on offering shoppers comfort and convenience by locating up to 150 stores under one roof in a climate controlled atmosphere surrounded by adequate parking. At Rimrock Mall, we rely heavily upon electric energy in the creation of our "Great Indoor" environment inside the Mall. For the most part, it is electrical energy that allows us to make the statement in our advertising message:

> "Shop in 72° comfort year 'round at Rimrock Mall".

Shopping Center developers across the nation have become more and more cognizant of shopping center developments with the advent of environmental protection and regulation. As owners of Rimrock Mall, we are proud to say that Rimrock Mall is the quality type development that is a positive influence in the growth of Yellowstone County and State of Montana. As a recent outsider and now a new resident of your State, I would like to take this opportunity to inject a personal observation based on an ongoing interest in the State's economy as expressed in media publications.

During the next 24 months, the citizenry of Montana will be asked to make many decisions regarding the potential growth of this State's economy. We acknowledge the necessity of citizen, State and Federal Government Agencies in making every attempt to insure that it is careful and planned growth and that the citizenry will not have to choose between the preservation of the natural resources and their exploitation.

As representatives of a $30 million vote of confidence towards careful and planned economical growth within the State of Montana, we see population growth as a necessary part of our potential to do profitable business during the next 30 years at Rimrock Mall.

At the same time, we also acknowledge the necessity of adequate utility service being made available to incoming commercial, residential and industrial ventures such that existing business will not be forced to sacrifice on their behalf.

By April 1, 1977, when we estimate 100% occupancy at Rimrock Mall, it is estimated that as a total project, Rimrock Mall will account for 3,600 kilowats of demand and 1,300,000 kilowat hours of electrical consumption during an average month. As previously described, this electrical consumption is a vital part of our shopping atmosphere which will ultimately account for over $35 million in retail sales per year.

As owners of Rimrock Mall, we express concern for the day when electrical generating capacity may force us to curtail operations in part or in entirety. We have experienced that condition during the winter of 1974 - 1975. We also feel that we should lend our influence to protect the 80 or more individual business ventures within our Mall from exorbitant utility costs that may arise as a result of the ~~loss~~ law of supply and demand, should generating capacity fall below the demand of the consumer.

As a private enterprise endowed with a certain amount of public trust and confidence in supplying electrical power, we feel that Montana Power Company deserves the opportunity to do profitable business and generate sufficient electrical power to meet the potential demand of its customers. For that reason, Billings Associates is represented here to day to protect our investment in the economic future of Montana.

Thank You.

HEARINGS EXAMINER: Mr. Sheridan.

EXAMINATION OF MICHAEL L. MURPHY

Cross, by Department of Natural Resources and Conservation

By Mr. Doney:

Q Mr. Murphy, my name is Mr. Doney. You're the general manager of the Rimrock Mall in Billings; is that correct?

A Yes.

Q How long have you been in that capacity?

A Since May 15th, 1975.

Q Is that when the mall opened?

A No.

Q When did it open?

A September 11th, 1975.

Q I take it your testimony is that you want energy for the mall, is that correct?

A Essentially, yes.

Q If there were enough energy available without Colstrip 3 and 4, would you still be in favor of Colstrip 3 and 4?

A Not necessarily, unless it impeded future growth to the state due to a lack of available energy.

Q Do you know that 70 percent of the power in 3 and 4 will be shipped out of the state?

A I'm aware that there are partners involved in the development of that facility.

Q And do you know that the power -- 70 percent of the power will be shipped out of the state?

A I wasn't aware that it would be shipped out of the state at all times.

Q Have you read environmental impact statements filed in this matter by the applicants and by the Department of Natural Resources?

A No.

Q Do you know Mr. Bellingham from Billings?

A First name?

Q Glen.

A Employed by?

Q He's a lawyer; do you know him?

A I don't.

Q Did anybody ask you to come up here and testify today?

A I was approached by our partner in the project, Bruce Crippen, who was then approached in early 1975 by Mr. Belden from Montana Power. Mr. Crippen is our partner in the development.

Q What energy conservation measures does the mall take?

A The shopping center itself?

Q Yes.

A What energy conservation?

Q Yes.

A As far as, the parking lot lighting system was developed using high pressure sodium vapor, which utilizes less electricity for the kilowatt -- or for the lumen output than any other type of lighting that is generally available. As far as the enclosed mall, it is lighted by mercury vapor, which is about the second or third most efficient form of lighting as opposed to incandescent. Other than that, the heating and air conditioning system is engineered to perform at peak economy utilizing electricity and natural gas.

Q I notice in your statement you say that by April 1st, 1977, the mall will use approximately 1,300,000 kilowatt hours of energy in an average month; is that true?

A Yes.

Q Do you know what that figures out to be in terms of kilowatts or megawatts per year?

A Megawatts per year would be 12 times 1.3, which would be what?

Q That would be megawatt hours; I want megawatts. Do you know what it would be in megawatts; have you calculated that out?

A No, I don't normally deal with megawatts; it's a mathematical function.

Q What temperature do you keep the mall at during business hours?

A The system is designed to perform within certain tolerances. We would accept anything as low as 68 degrees in winter during extremely cold temperatures, and anything below 73 or 74 degrees in the summer during extreme high temperatures.

Q What time of the evening does the mall close?

A The mall stores close at 9 o'clock. One of the department stores closes at 9:30. We do maintain -- we are open late for the theatre and we will have a dining establishment there that will be open late. What you probably want to know is, do we turn down the air conditioner or heating at night.

Q You're anticipating my questions, but that would be one of my questions, yes.

A The answer to that is no. We have [illegible] I'm not [illegible] [illegible] found that [illegible] installed, the air conditioning units, which are packaged units and there are 14 units on the roof, 9 of which are heating, 5 of which are circulating air only; and these were set up on a time clock to shut off at 11:00 at night and turn on at 7:00 in the morning. And we have found that we could not maintain comfortable temperatures during the cold season by doing this, so we turned off the 5 circulating air only units and let the others run 24 hours a day; and set the thermostats at 70 degrees. We have only deviated from our norm a couple of occasions when the temperature had been sustained below zero for 24 hours.

Q Do you turn off the parking lots when the mall is shut down at night?

A The parking lot lights are on different circuitry. One of the circuits is on an astronomical time clock; the other is on light activated -- a certain amount of the lights are left on all night directly surrounding the building for security purposes, and also the parking lot lights directly above the street entrances to the mall. All the others are off 30 minutes after closing.

Q Have you taken any other energy conservation measures, other than the ones you've mentioned, that you can think of?

A One measure we've taken since the mall was opened; there are only two entrances to the mall as such, the front entrance came equipped with a vestibule or double glass doors. Since opening, it's become evident that we need it on the rear doors as well so we've added that in. It's currently being installed.

Q Any others?

A Beyond that, the mall was designed with 16 - 8-foot square skylights in it to permit sunlight and supposed heat during the winter. When you're setting a thermostat at 70 degrees, many things can affect it to make the unit run or not run. One of those could possibly be light heat from natural sources.

Q Would you be in favor of Colstrip 3 and 4 if the energies were still supplied to your mall without Colstrip 3 and 4?

A I believe you asked me that once before.

Q I'd like you to expand on your answer a little bit, please.

A Well, our interest in somewhat two-fold here. Number 1, we're interested in having sufficient energy as predicted for 1977 at a rate that we can afford, in order to continue to do profitable business. The other side of the coin is that, by April 1st, 1977, we expect a certain amount of growth in the state, and that's why we came to Montana and developed this $30,000,000.00 project. If, according to what the powers that be in Montana, determine there's enough electricity to substantiate the amount of growth that the people of Montana want during the next 30 years, then fine; why do we need additional generating plants.

Q What about jobs; are you in favor of more jobs?

A Certainly, but I don't think that's a reason to build a generating plant. The reason you're building a generating plant is to generate electicity.

Q If the coal were not burned in Montana Colstrip 3 and 4 but shipped out of the state and more jobs were created as a result of that, would you be in favor of that?

A Assuming the electrical generation were adequate for what I already described, I'm essentially in favor of more employment than excess electrical generation.

MR. DONEY: No further questions.

WITNESS: Excuse me. Are you with

HEARINGS EXAMINER: Mr. Meloy, the gentleman that just examined you -- that is a fair question -- is an attorney for the Department of Natural Resources, and are registered parties in this action. And this is Mr. Meloy, he's an attorney for the Northern Cheyenne Tribe, Inc. Is that correct?

MR. MELOY: That's correct, Mr. Davis.

Cross, by Northern Cheyenne Tribe, Inc.

By Mr. Meloy:

Q Just a few questions, sir. "Shop in 72 degree comfort year around at the Rimrock Mall"; that's the -- you're proud to be able to make that message, aren't you?

A That's the competitive advantage of creating an enclosed mall shopping center.

Q Does that mean that when it's 30 degrees below out and people walk in, they've got to have a place to hang up their coats?

A Well, that's somewhat of a rhetorical question. It depends upon the individual. A lot of people carry their coats. We don't provide any place for them to hang their coat or a locker for them to put it in.

Q I guess it is a rhetorical question and I'm asking it because I'd like to know why you think that gives you a competitive advantage?

A Well, you keep your home between 68 and 72 as well. We prescribe to the theory of an enclosed mall wherein there are blossoming flowers year around and vegetation and it's a comfortable place to be, and it's theoretically the same environment 365 days a year.

Q But if you had a coat that was enough to keep you warm in 30 degree below weather, and it does get that cold in Billings, does it not?

A Yes.

Q Then, one would assume that with that same coat on, it might be a little warm in 72 degrees?

A That's true. You take your coat off when you go home, too, don't you?

Q Right. But we have a place to hang it, too. Now, 72 degrees is nice, right?

A Yes.

Q Sixty-eight degrees may also be nice, too; right?

A That's true.

Q And there is a difference in terms of how much electricity it takes to produce that average difference?

A I disclaimed a real knowledge of what that would be. There are many factors that influence the temperature inside our mall; how many times the doors are opened and closed, things like that.

Q Okay, but my question was and I understand that you don't know what the difference would be; but, my question is, there is a difference?

A That's true.

Q Does it take more electricity to keep your place at 72 degrees than it would to keep your mall at 68 degrees?

A In the winter it would. Thermostats are set at 70, because at 70, during extreme cold, that keeps it within comfortable limits. I imagine if you took your drybolt and measured what our average temperature was at different locations throughout the mall, and it varies near the entrances and near the heating vents; I'd imagine the average temperature does vary. And I'd think that when it was extremely cold, anywhere from 62 to 68 would probably be more accurate. Nonetheless, 72 degrees is an advertising phrase, and 72 is somewhat commonly accepted, other than in energy crisis.

Q Oh, if we have an energy crisis, then --

A We'd probably not make that big a deal out of 72 degrees. We'd say, in comfortable climate.

Q Mr. Christiansen, when he testified, told us that he'd like to keep his thermostat at 68; he finds that to be very comfortable.

A What is his --

Q His house. When you talked about the demand on page 3 of your statement, that demand was based on 100 percent occupancy?

A Yes.

Q What is your occupancy percentage right now?

A Approximately 36 percent.

Q Thirty-six percent?

A We're just -- March 4th we'll be opening another two department stores and 10 tenant stores, and we'll be at about 52 percent at that point. So we're kind of opening stores each day, so that's why I hesitated.

Q There are certain amounts of demands that are daytime demands, meaning the parking lot lights, things that you've got on right now?

A Yes, our experience in operating 24 regional shopping centers throughout the western part of the United States and in Virginia is that during this period of 1974-75 when we were asked by California Edison and Bebco of Virginia to cut our power, our estimates shown by comparing tenant, which is tenant store use, versus what the mall actually uses, was that 80 percent of all consumption in a regional shopping center is consumed by the tenant stores. These are the people with the showcase lights and the incandescent spotlights and things that really consume the energy. So we went back to California's and Bebco and told them that we would be able to consolidate a certain amount in the common areas of the shopping center; but, really, it was the tenant stores that consumed the energy. The calculation of that estimate is my own.

Q When did you first decide to build this shopping mall in Billings?

A It was early in 1974. Excuse me, it was in -- the initial partnership concept originated in late 1973. Ground was broken in July of 1974.

Q Did you know at that time where you would be getting your electricity?

A Where we would be getting it?

Q Yes.

A With regard to what? Where it was being generated, or --

Q Well, you must have known at the time that there had to be available electricity to run your mall at 100 percent when you planned it; right?

A Yes. We hoped for that.

Q Well, you were fairly sure about that, were you not; you wouldn't have built it if you didn't know you were going to get the electricity.

A I'd have to assume that's true, yes.

Q Is there any other possibility?

A We assume there's adequate water; we assume there's adequate natural gas; but we see how that may not be accurate due to circumstances beyond our control. Once again, referring to the much hoped for growth that we hoped for, which we once again reiterate and take into account your feelings, acknowledge citizen, state and federal government agencies in making sure that it's careful and planned growth. Nonetheless, we don't feel that we want to sacrifice at some future time if another mall is built in West Billings. We certainly hope that somebody doesn't have to come to us and say, we expect you to pick up 30 percent so we can substantiate this other $30 million project that's coming in.

Q Okay, so, I guess I get in summary to what your saying is that you'd like to have the electricity to run your mall, but you don't want to see anybody hurt by the generation of that electricity; isn't that what right?

A No, that's not what I said.

Q It's not?

A I said I want to have the security of knowing that I can get 3600 kilowatts of demand and 1,300,000 kilowatt hours a month of electrical consumption in 1977, and know that if that growth that happens in Montana as we hoped for; we want to know that beyond that time, we won't have to cut back in order to share it with somebody; but there will be adequate generation of power. I'm not saying I don't want growth because I don't want to share my electricity; I'm saying, I want there to be enough electricity so I don't have to share it.

Q Well, when you built your plant, when you planned to build your mall, you assumed that there would be enough electricity?

A That's true.

Q And you're here now, I take it, as a witness saying, I've built my mall, I assumed there was going to be enough, and we've got to have units 3 and 4 to make sure we have enough electricity?

A Essentially, yes.

Q I think you told Mr. Doney that you didn't know how many megawatts 1,300,000 kilowatt hours translated to?

A That's true.

Q Would you be surprised to know that that might be 1.8 megawatts.

A Megawatt doesn't really mean anything to me as a term.

Q Do you know how many megawatts are being produced by the two proposed units?

A They are 700 each?

Q I guess my last question is one I thought you said, and I'll ask you directly: You want to have enough electricity to keep your mall at 72 degrees, right?

A Or at a temperature for human environment year around.

Q And you don't want to see people who might be hurt, hurt by the generation of that power; would you?

A Let me ponder that for a moment. I would hope that any generation of power in the state of Montana, would take into account environmental considerations in so doing. Shopping center developers as secondary sources have come under the attack of environmentalists across the nation; and I would -- you know, that's not really my point here today. We have been classified as secondary sources, etc.

Q Well, I guess my question is, I'll put it to you by way of hypothetical: If the environment, and that includes the people and the lifestyle and all the various aspects, air and water, in the area of the generation station, and in this case we're talking about Colstrip; if they were to be hurt by the construction of these plants, you would not want this to happen just so you could keep your customers at a comfortable 72 degrees, would you?

A That's true.

MR. MELOY: I have no further questions.

HEARINGS EXAMINER: Thank you, Mr. Murphy. Your testimony will go to the Board. We'll have to take a 10 minute recess to change our tape and get ready for Mr. Wickes.

(Witness excused.)

Recess: 10:40.

Following a brief recess, the hearing reconvened at 10:55 A.M. on February 19, 1976.

HEARINGS EXAMINER: Are you all set, Gwen? Very well. Mr. Ross?

GARY J. WICKS, having previously been called as a witness by the Department of Natural Resources and Conservation, and having previously been sworn upon his oath, resumed the witness chair for the continuation of his examination and testimony.

CONTINUATION OF EXAMINATION OF GARY J. WICKS

Cross, by Applicants

By Mr. Ross (continuing):

Q Yesterday, Gary, when we left off, we were talking about the demand for electricity; and on page 6 at line 25 of your statement, you mention some of the reasons for what appears to include some of the reasons why there possibly has been a decline in the demand for electrical energy. And one of the first ones you mentioned there is conservation, which you also discuss later in your statement. So let's talk a little bit, first, about conservation. Isn't it true that the savings from conservation are often experienced only once?

A Only once?

Q Yes, for example, let's assume that in 1973 we had people turn down their thermostats from 70 to 65, and other such conservation measures; so in 1973, say, maybe the results we saw in the 5 percent decline in energy. However, in order to have that same or another 5 percent decline, say in 1974, we would have to have people cut their thermostats from 65 to 60 and extend the other conservation measures another notch, or we're only going to see that savings once in the year 1973. Isn't that a reasonable analysis?

A Well, I think that the -- I still don't know exactly what you're trying to say. It's my impression that whenever you conserve energy, that savings goes on, so that if you're talking about the demand curve in total, it would have the effect, at least just off the top of my head, of reducing the demand curve all the way along, whether or not -- where in that curve you experience your conservation savings, I think is important, but the whole curve would be dropped down considerably.

Q But isn't it true that once you make that initial lowering of the demand curve, the demand curve then starts going up again?

A Oh, that depends upon a number of factors. I think as we have indicated in previous testimony, there are a number of factors that should be considered in projecting the demand for electricity. Conservation is only one of them, and so I can't -- I don't think you can just say the demand is going to continue to increase. Once you've made the saving of conservation, you have to consider the other factors that might be involved; for instance, if you did make the conservation saving at one time and then there were severe -- more severe depression than we've experienced in the past couple of years, then that might counteract the demand also, and so the effect of the curve would be to still stay flat or even decline.

Q Alright, we'll get to some of these other factors that may affect them, but I'd like now for us to concentrate on looking at conservations. Isn't it true that the facts have born out the analysis I just made that conservation is a one-shot savings? For example, let's take a look at Puget Sound. Are you aware that in 1973 under an extensive conservation program, they had a 7 percent savings; but since that time, their loads are now growing, and in 1975, in fact, they're back to a 7.4 percent load growth; wouldn't that indicate to you that this conservation program in 1973 was a one-shot thing?

A Well, I don't know, John. I just have the most recent figures out of the Bonneville Power Administration, their power situation statement for January, and they are seeing that the Pacific Northwest coordinated system total load was 13.8 percent below the peak estimate and 8.3 below the energy estimate for the month; and I understand that when you make these projections, the factor of weather is taken into consideration, so I'm not sure that that's an accurate statement. Furthermore, incidentally, the --

Q Are you relating those figures to conservation?

A No, I'm just saying you've related your figures to conservation, and all I'm saying is that I am not convinced by your statement that the BPA load growth has -- growth rate has gone back to where it was before 1973.

Q My question related to Puget Sound Power & Light Company and their conservation program in 1973 and then the fact that in 1975 they're back at a --

A Oh, you said BPA and I agreed that I am aware that BPA did experience a 7 percent reduction.

Q Well, I thought I had related that to Puget Sound Power & Light Company, and intended to.

A Incidentally, in that same report it mentions that during January, over 2 million megawatt hours of surplus energy was shipped to the southwest by the Pacific Northwest Utilities.

Q Again, we'll get to some of the other reasons why, possibly, the load might be down, but let's stick right now to conservation. And, let me ask you this, do you think that voluntary conservation works?

A It depends on how you define voluntary.

Q How do you define voluntary?

A Well, you're asking the questions so I would anticipate that you would define it for me. What I'm saying is -- do you mean by voluntary, you put a few ads on television and you expect people to respond to that; is that your kind of voluntary effort?

Well, that's true, Jack, you're asking the questions, but I'd like to know so I can answer it as to what the definition of voluntary is.

Q Well, strike that and I'll ask my first question. What does voluntary conservation mean to you?

A Now you're giving me a chance to define it, right?

Q Right.

A Thanks. Well, I guess I can't give you a good definition of that, but I'd like to say that I think -- my opinion is that conservation efforts have to be made, not only in this region but also in the nation; and that these conservation efforts may involve voluntary, and that is, you go out and tell people what the problem is by explaining the problem to them and some of the impacts of the energy problem to them, that they may voluntarily reduce their energy requirements. But I think that there's also going to be other efforts needed, and we, and I think you know, that the energy ERDA is adopting some pretty specific goals as to what conservation efforts of this country must be in the next few years. For instance, I think in the next 5 years, they expect to reduce gasoline consumption by 25 percent; they expect to reduce industrial consumption, I think, in the next 10 years, by 50 percent. So, what I'm saying, I guess, in a roundabout way, is that I think you can't talk about conservation in just strictly voluntary or nonvoluntary terms because I think what we're facing is a situation where conservation is going to have to be practiced in a number of ways.

Q Well, my question was, what is your definition of voluntary conservation, and I gather from your answer, it involves going out and talking to people about saving energy; is there anything else that to you would include as voluntary conservation?

A I think the effort by BPA in 1973 is an example of voluntary conservation. There is no real incentive except the understanding among the people, I guess, in the Pacific Northwest, that there was a shortage of power that caused those people to reduce their demands for energy. I would call that an example of voluntary conservation. However, I also think there are other types of voluntary conservation; for instance, if there is an incentive program where you make it clear to people that they're going to save money by -- and I don't just mean through the use, but they actually get some kind of obvious benefit through the conservation of energy; I think it's going to have an effect. I think we've already had somebody here testifying to the price elasticity of energy demands, and I think it's a factor or a approach that is receiving a great deal of study, and I think results are going to show that conservation along a number of lines can have an effect and is an appropriate way to go.

Q So, you're saying that BPA efforts in 1973, you would say, are an example of voluntary conservation?

A Yes.

Q Are you aware that in 1973, BPA had to cut back a lot of industrial customers, which involved shutting down plants, including plants in Montana; do you consider that voluntary conservation?

A I think that's the kind of thing that's going to happen, or could happen if this nation does not get on a more positive conservation program. As I recall Mr. Hodel's comments, he lauded the people of the Pacific Northwest despite the cutbacks. The people -- they didn't have a voluntary opportunity to cut it back. When BPA shuts your power off or says they're going to cut it down, that's hardly voluntary, now, is it? But the people that had the choice, the consumers, the residential consumers, Mr. Hodel lauded them for voluntarily cutting back their electrical demands.

Q You are saying now, then, that the curtailment by Bonneville of industrial customers; you wouldn't say that was voluntary conservation or curtailment?

A I don't see how you could make that statement.

Q Well, let's get back to my initial question, do you think voluntary conservation, as you explained your understanding of it, do you think it works?

A I think, depending on your definition of voluntary -- my definition, which includes letting the people know the problem, some of the effects of the problem, and some incentive to save energy, if I can use that definition, then I think unequivocally it works. We've seen it work in this country. We've seen the shift from larger cars to smaller cars; we've seen -- we know the people have cut down energy, as it was testified to yesterday; we know that in Los Angeles, through a program of energy conservation, they have reduced energy demand, electrical demand in that town -- city by about 20 percent. So I think the effect of conservation efforts, and I mean genuine conservation efforts, including voluntary and some incentive type program, can have an effect, unquestionably.

Q Are you aware that there's testimony in this record that conservation doesn't work, including the statement from Lieutenant Governor Christiansen that it doesn't work; and statements from rural cooperatives in Montana that conservation efforts were short lived and didn't work; are you aware of that testimony?

A I would be very surprised if the Lieutenant Governor said that conservation did not work.

Q Would you be surprised if he said voluntary conservation did not work?

A Depending upon his definition of voluntary, which may be different than mine.

Q Well, do you think that we need some sort of mandatory or forced conservation or curtailment in this country?

A Are we getting into a philosophical discussion now?

Q No, I'm just asking you a question; do you think we need to have some sort of a mandatory or forced conservation or curtailment?

A I think, this is my opinion, I firmly believe that if the country does not embark on a different approach to solving the energy problem, that the involuntary kind of cutbacks you talk about in the Pacific Northwest in 1973 will become a common occurrence.

Q When you say, unless we do something about the energy crisis in this country, we're going to have some sort of forced curtailment, what do you think we ought to do about the energy crisis to avoid forced curtailment?

A I think, as numerous studies have indicated, John, that conservation is one of the -- has to be one of the prime objectives of this nation in solving its energy problems.

Q Well, I don't think any of us are really disagreeing that we have to have conservation and should avoid wasteful energy; but what I'm trying to find out is what degree and what steps we should take to implement conservation. For example, are you aware that Russell Cox, representative of the coops in the state who testified here earlier; he said, I do not doubt that we need to conserve energy. But a number of conservationists point to 1975 and the low growth rate in that year. And then he points out, at what cost was this low growth rate. He points to the massive unemployment that we've had, he points to the economic turmoil, and all the goods and services that were not produced in this country. Would you agree with his analysis that we can't have conservation of that nature that results in unemployment and the loss of goods and services?

A Well, I think that statement is absolute nonsense. And, let me give you a little example, John. Let me just explain why I think conservation is a good approach to saving energy. Do you mind if I ask you a question, despite --

Q If you don't understand my question, certainly, ask me.

A Well, then I won't ask you because I understand your question, but I wanted to get an opinion from you. One of the problems we have in this country, one of the reasons, as I understand it, that we have unemployment, is the lack of capital investment. Industry is not investing capital. There is a tight money market, high interest rates are prevalent, and therefore the capital investments that normally would be made are being delayed. Okay? Secondly, I think energy -- or following up that point -- I think energy savings could increase the amount of capital that are available for jobs. I'd like to give you an example. The British Petroleum, and a number of other industries have found just by small changes in their operating procedures and small adjustments in their plant, that they could save over $1 million a year. Now, in my mind, that $1 million would be freed up for capital investment and could go to create new jobs throughout the country. That's one advantage of conservation from my point of view. The other advantage is that you save energy and you not only save energy in terms of absolute terms, but you also make more energy available for other jobs. And we know that at least some jobs are dependent on energy, and if the energy is available through conservation efforts, that energy could be used to create new jobs. Now, I think the idea that we have to have a depression to conserve energy is nonsense; and, as you well know, the various number of studies have shown, the Ford Energy Study, the study done by the FEA; in fact the study done by the FEA shows you can reduce without affecting the standard of living or without affecting the number of jobs in this country by perhaps as much as 50 percent. Now, I can't discard all the studies and assume that those people don't know what they're talking about.

Q Do any of those studies relate to Montana or the service areas of the applicants in this case?

A Not specifically, no.

Q Do you favor any sort of mandatory curtailment in the terms of legislative; in other words, do you think the legislature should pass some sort of legislation to force curtailment of energy?

A How do you mean; do you mean the legislature would say that certain categories of users would not have energy available to them?

Q Well, that would be one effort. All I'm suggesting is, do you think the legislature should pass some sort of law which requires some sort of mandatory conservation or curtailment?

A If that's the kind of thing you're talking about, then I think the answer to that is no; I don't think we're at the point where, in fact, we have those kind of problems yet. I think the efforts we've seen to this point in industry and to a lesser extent in residential consumers, have been such and will be such, because of the rising price of all forms of energy, that that will not be necessary, and I think we can meet our energy problems without any of that kind of legislation. Now, in terms of conservation, I think that we should look at the different types of incentives that might encourage people to conserve energy beyond the natural encouragement they are going to get from the price increases.

Q I think a moment ago you mentioned that there had been some success in conservation in the Los Angeles area, is that correct?

A Yes.

Q Isn't it true that that was done under a threat of a fine -- a monetary fine?

A It was done, if I recall, I think the incentive was that they set a goal for conservation, that if that goal was not reached on an individual basis, that they would have to pay an extra charge for energy.

Q Do you favor that sort of conservation?

A I don't think we're at that stage in the Pacific Northwest; they may be in Los Angeles.

Q Are you aware of the Exhibit C of public witness Pike's testimony in this hearing?

A No.

Q I'll show you Pike's Exhibit C and ask you to read the last sentence in the first paragraph of that letter.

A "Even a very successful voluntary conservation program, although necessary, will probably not be adequate to manage the forecasted electrical energy shortages."

Q What's the date of that letter?

A January 9th, 1976.

Q Well, this is a letter from the Bonneville Power Administration discussing the energy situation in the Pacific Northwest; and wouldn't you conclude from that letter that they think voluntary conservation is not going to be enough?

A I don't know what their conclusions are in that letter. My conclusions are, as I stated before, that conservation efforts, properly designed, whether it involves voluntary efforts or incentive efforts, will work. Every study that I've read to this point shows that they will work, they have worked in areas where they've been conducted in a meaningful manner, and so my statement on conservation stands.

Q Can you give me an example of a conservation effort that has worked over a period of five years, with resulting increased savings every year?

A I am not aware of that kind of a program, but as you well know, conservation has only become a supposed objective of this country for the past couple of years since the energy crisis in 1973. Before that, we weren't concerned about conserving energy, and the types of programs that we've talked about today were not implemented, so there is no real reason for people to save energy.

Q Well, can you give me any examples of conservation programs that have been successful continuously for a three year period?

A We know, as I said in my statement, at least the people who have studied the energy problems of this country, the FEA and other people, they are continually saying that conservation is having an effect; and I assume that they are correct.

Q Well, isn't it true, when we talk about the conservation of energy, that we've got to distinguish between the different types of energy; for example, isn't it possible that we can have a total savings of energy in this country, and at the same time see an increased rate of electrical usage?

A I suppose that's possible, depending on a lot of circumstances. But I don't think there's any question about the need for conservation of all forms of energy in this country.

Q Well, I don't think there is either. That's not my question.

A I answered your previous question.

Q You think it is possible, even conserving energy in general, we may see an increase in electrical usage?

A Certainly, and we have never maintained otherwise.

Q If we do have to go to some sort of mandatory conservation or curtailment program, by which I mean we would have to shut the load off or reduce the load of customers, how would you propose that be done?

A How would I propose that that be done; now, you're asking me to make an assumption that we get into that kind of situation; is that correct?

Q That's correct.

A I believe the BPA, the way they went, if I understand their procedure correctly; they cut off interruptable people first, stopped selling I guess what they call dump power outside the region, and those kind of things ought to be the first steps that you take. I don't anticipate that we'll be in that position in this region.

Q Are you aware that when BPA implemented their forced curtailment plan, that some of their customers refused to go along with it on the basis they had adequate energy in their own area and that they did not want to conserve and did not want to cut back?

A I wasn't aware of that, but --

Q What are you going to do if some people refuse to turn off their switch or -- are you going to go in and cut the wires or are you just going to let it black out?

A Now, come on, John. The -- nobody wants to see that happen, and we certainly aren't in a position of -- I'm not going to say that we're going to support that kind of thing. We've been talking in generalities here about conservation, and --

Q My only question to you is, assume that we have to go to a curtailment program; how are we going to do it?

A I just mentioned the way that I thought BPA did it, and what I want to say is, we haven't even tried in this country to get to the initial steps in conservation, except in certain areas; to avoid that kind of things, if we adopt some significant and meaningful conservation programs right now, we will never get to that kind of situation, and we plan for energy development, we plan for the use of energy; I think there is no reason to believe that we're going to get into that type of a situation.

Q That's your opinion?

A That is my firm opinion.

Q And don't you know there are others who have opinions that such conservation programs won't work, and we're going to have to build additional generation?

A I'm sure that you could find opinions, hundreds of opinions on any different subject that we might talk about today.

Q Let's get to another area which you indicated as a reason for what you claim is a slackening of the demand for electricity, and that is the recession that this country has experienced over the past year or two. Don't you think that the recession that we've had in this country has had an affect on the demand for energy?

A Certainly, I mentioned that in my statement.

Q And, for example, are you aware that the cutbacks in the Anaconda Company in Butte and Great Falls has lowered the demand for electrical energy projections of the Montana Power Company?

A I would expect that they would; I'm not certain of that specifically.

Q Taking this one step further now, now that we see a recovery from the recession, wouldn't you expect those loads that declined because of the recession to come back?

A I would -- if we're talking about opinions, John, I'm sure I could bring in -- if we had any money left -- could bring in 50 or 60 of the top -- maybe not that many, but a number of the country's top economists who would not say that the recession is over, and I'm not convinced of that. We've still got a high unemployment rate, all the things that go along with the recession are still there.

Q Well, you said that you think there is a relation between the demand for electricity and the recession?

A Yes.

Q You wouldn't want to see the recession continue just in order to keep that demand down, would you?

A That's a ridiculous statement; nobody wants to see the recession continue.

Q You wouldn't want to see the recession reoccur just to keep that demand down. If the recession is over with and the economy comes back, don't you think it's reasonable to expect that some of these industrial loads that have been down because of the recession, will start coming back?

A Yes.

Q And hasn't, in fact, that already happened in 1975 and '76 on some of the applicants' systems?

A Well, I don't know. I just turned to this document here that you wanted to discuss later, but if you say the recession is over with and we're returning back to normal load growths, the figures from Bonneville Power Administration seem to contradict that.

Q Isn't it true that the aluminum industry is one of Bonneville's big customers in the Northwest?

A I think it is, yes.

Q And isn't it true that the aluminum industry is only using --

is only at half capacity and is only using about half of their previous electrical energy?

A I don't know exactly what their operating capacity is, or what they're operating.

Q If that be the case that they are at about half load and they are a big customer of Bonneville's, wouldn't you think that would be one factor that's affecting the lower projections of the Bonneville system?

A It could be, but hasn't Bonneville taken those things into consideration when they make their estimates; don't they believe that the recession is ended?

Q Aren't you aware that even with the recession on in the Northwest, there was over a 3 percent increase during that recession, of electrical energy?

A Am I aware of it, is that the question?

Q Yes.

A I wouldn't be surprised, but that is a considerable drop in energy demand -- that is a considerable drop in energy demand from the growth rate that we've experienced in the past.

Q I think you have in front of you a report on Bonneville's loads; and if you would look at that please --

MR. SHERIDAN: Let's mark that as an exhibit please. Can we have that marked as a DNR exhibit then?

HEARINGS EXAMINER: You can mark it when your case comes on.

MR. SHERIDAN: Well, just for reference purposes at this point.

HEARINGS EXAMINER: What is it that you're referring to?

MR. SHERIDAN: January, 1976, Bonneville Power Administration Power Situation Statement.

HEARINGS EXAMINER: That's not the letter from Pike that you're referring to?

MR. SHERIDAN: No.

HEARINGS EXAMINER: What number do you want to put on it?

MR. SHERIDAN: Just whatever the next number is.

HEARINGS EXAMINER: I don't know; we don't keep track of them.

MR. ROSS: Why don't we wait until we get to rebuttal; all right?

HEARINGS EXAMINER: Well, you can refer to it by the date of it and so forth; we'll get a number and put on it.

MR. SHERIDAN: Okay.

Q If you'll look at the bottom column on the first page of this report, the Bonneville Power Administration dated January 1976; if you'll look at the bottom column, it says coordinated system load?

A Yes.

Q And you look over on the very far right column, doesn't that indicate to you that there has been over a three percent increase in both peak and energy in the Bonneville Power Administration?

A Well, this statement says as for energy, that as a percent of the same period last year that they're using or did use in that period, 103.2 percent more than last year.

Q Doesn't that indicate to you a three percent increase over the previous year?

A Well, John, it may indicate a three percent increase. I guess what I'm coming back to is that their estimates were that they were going to be considerably higher than that, and we're talking about -- they're still 8.3 percent below the energy estimate for the month.

Q I think even in your own statement you indicate that the reasons for a possible reduction of the load projection is because of the recession; isn't that correct?

A We've been over that about four or five times, and if you want --

Q Your answer is that that's correct; isn't that right?

A Page 6, reasons for the slowdown appear to include conservation impact efforts, the impact of increased relative electricity prices and general economic factors related to one of the most severe recessionary periods since the 1930's. Now, that's not only my opinion, that came out of, I think, one of the last references I saw to the reasons was in Electrical World.

Q Even with this recession, and, as I mentioned, which includes about a 50 percent load of the aluminum industry in the Northwest, we still had over a 3 percent load growth in the last year; have we not?

A It appears that they were using more energy, that the BPA was using more energy than they were at this time last year over that period.

Q Wouldn't you expect that if the recession continues to disappear and the aluminum industry comes back to full load, wouldn't you expect that the loads of the Bonneville Power Administration system would increase beyond that three percent?

A The only thing I can say is that I would anticipate that Bonneville Power Administration is taking that into consideration, that they are anticipating a recovery from the recession; and if they are and that is indeed what is happening, then they are still 8.3 percent below the estimates. Now, certainly they must build into their projections the possibility of the aluminum industry going back to a more fully operational capacity. And even if the aluminum industry does increase capacity, I think that we're finding out that even the aluminum industry is embarking on pretty strong conservation efforts and that they've already anticipated saving 5.2 percent in energy, and this is in this region, and that's since 1972. You asked before if we ever had a sustaining conservation program, they've saved 5.2 in energy demands since 1972 and they anticipate saving at least 10 percent by 1980.

Q Well, isn't it correct that the projections of the Pacific Northwest indicate the deficiencies in the future years?

A What kind of energy?

Q Electrical energy.

A Yes, I know, but do you mean peak or average?

Q Both peak and average energy.

A What years are you talking about?

Q Average energy starting in 1979 and 1980.

A I recall there are some deficiencies, but I also recall there is no deficiency in peak energy until after 1985.

Q Another thing you refer to is increased electrical rates --

A Yes.

Q as having an affect on electrical demand. Isn't it also true that increased rates of competitive energy forms may have an affect upon electrical consumption?

A It could, yes. I'm not certain that it will.

Q Aren't you aware that there have been a rather significant increase in the price of natural gas in the Montana Power Company system in --

A I recognize that every month that I pay the power bill, John, yes.

Q And are you also aware that there is a problem of natural gas supply in the state of Montana and elsewhere?

A Of course. I refer to that in my statement.

Q Wouldn't you think with, number 1, this increase in price of natural gas in Montana and the problem of supply, that we're going to see people switching from natural gas to electricity?

A I don't know that that is the case because I don't know that even the power company has told us what the anticipated cost of natural gas will be; and I think that people are going to wait for that information before they make a judgment to switch over. If I recall, Mr. -- Lieutenant Governor Christiansen's testimony, I believe he suggested that it might be a long time before that happens because there still is a substantial price differential between natural gas and electricity.

Q Are you aware that Mr. Coldiron, an officer of the Montana Power Company, testified in this hearing that he thinks there is going to be a switch from natural gas to electricity in the state of Montana?

A Well, if that is the case that there is going to be a switch to electricity from natural gas, why hasn't -- this is a question I'll just -- why hasn't the Montana Power Company come in to us, to the Department of Natural Resources, and suggested or at least said that they anticipate a switchover would take place and that, therefore, there would be an increase in demand for energy? Why hasn't the Montana Power Company included that switchover in their estimates of demand for energy in the state of Montana? Now, you know and I know that in your 10-year plan filed with us last year, that even with Colstrip 3 and 4, you're not going to use all the energy that comes from the 30 percent from 3 and 4. I believe in 1980, with 3 and 4, you're going to have a surplus of about 296 megawatts. Now, if we're going to switch over to natural gas, it seems to me we should be making plans to start using that energy for natural gas and not just call it surplus.

Q I take it your answer to my question is yes, you're aware Mr. Coldiron testified to --

A I am not aware of Mr. Coldiron's testimony; I am aware of the natural gas problem in the state of Montana.

Q Are you aware that Mr. Hofacker testified in this hearing that we do, in fact, think that the power from units 3 and 4 will be needed to take care of switches from natural gas to electricity?

A We have had no communication from the power company to that effect.

Q And, have you read Mr. Hofacker's testimony in this hearing?

A No.

Q Are you suggesting, by what you said a moment ago and in your written statement on page 7, that assuming that there was no stated commitment by the applicants that power from units 3 and 4 would be needed to accommodate switches from natural gas to electricity, are you suggesting that power from 3 and 4 can't be used to take care of these switches from natural gas to electricity?

A As far as I know, we have not been made aware of the contractual arrangements you might have with the other applicants. I don't know what the restrictions are on that; all I know is that 30 percent of the energy from 3 and 4, at least 30 percent of the project will be owned by Montana Power Company.

Q Well, you're not saying that if some of the coops come to the Montana Power Company and say, we need an increase in electricity next month because we've had a lot of demands for switch from gas and propane to electricity; you're not suggesting that we say to them, we didn't include that as one of our reasons for 3 and 4, so we can't give it to you; you're not suggesting that, are you?

A I am suggesting that if you had anticipated that, it would seem reasonable to me that you would include that kind of information in your projections through 1985, and you have not, apparently, done that. Therefore, if you would come to us and suggest this is going to happen, I think you ought to adjust your projections and then we've got different figures to work with.

Q Well, don't you think the Board, when they're examining the need for electrical energy in Montana, that they should take into consideration these demands for electricity because of switches from natural gas?

A Why should the Board, when the Montana Power Company didn't?

Q That's assuming that was not taken into consideration; is that correct?

A As I said before, even if they are taken into consideration, you, the Montana Power Company, according to your projections, are not going to use the 30 percent of energy that you supposedly have in conjunction with units 3 and 4.

Q This leads us into another subject. Let me ask you, don't you think there are probably a number of factors, such as switches from gas to electricity, that aren't included in the applicants' load projections, that may well increase electrical demand in Montana beyond what the applicants now project?

A That's a possibility, but how do you make decisions based on a conjecture like that? We have the responsibility, the Board has the responsibility of making decisions based on the information that the Department submits, and that's submitted in this hearing. And we have to go by, or at least we did when we determined our recommendation, we assumed for the purposes of making that recommendation, that your projections are accurate, that you did consider those kind of things. More on the natural gas question, as you well know, in the last couple of weeks there's been a development there that may alleviate the problem, or at least put off the problem until some time later in the future. The Canadians have apparently decided that they are at least going to extend the permit for exportation for natural gas for another year and may, I understand, increase the amount of natural gas that's available for Montana.

Q Are you aware that there have been people testifying in this hearing that, in fact, they think the applicants' load projections are too low?

A No.

Q Are you aware that Mr. Greytak, who is the biggest sprinkler irrigator in this state, has testified that he thinks the Montana Power Company has underestimated their load by some 100 megawatts during the next ten years because of what he sees the sprinkler irrigation coming on in the next ten years?

A Well, if you're going to use one witness to question the credibility of your projections, we have brought in, I don't know, four or five witnesses that question the credibility of those projections also.

Q Isn't the situation this, then, that there are people that will say the power company's projections are too low and there are others that say they are too high; is that right?

A Right. I would presume that to be true.

Q Let's talk a little bit about the applicants' load projection. Are you aware that they are continually updated?

A I presume that would be good business practice, yes.

Q Are you aware that just prior to this hearing they were revised, taking into consideration the factors that you mentioned, the recession and conservation?

A No, I haven't seen those figures.

Q You're not aware that the applicants considered those factors in those continuous revisions?

A Are you telling me that the projections are substantially changed from those submitted in, I believe, April of last year?

Q I'm saying that they were changed. You weren't aware that they were, in fact, lowered to take into consideration --

A No, I have not seen any documents to that effect, no.

Q It they were, in fact, adjusted to take into effect such things as conservation and the recession, wouldn't you think they would be quite accurate and up to date?

A It depends on what -- I'm not an expert in projections. It would depend on what factors were taken into consideration and what weight they were given in the projections. I think we're maybe missing a pretty fundamental point that I've tried to get back to numerous times, and that is that we do not question the need for energy in Montana. Now, that would be absurd. What we did try and do in our decision on 3 and 4 was to consider those needs, and we did; we used for those purposes the figures given to us by Montana Power Company. We assumed at that time that they were correct. However, there is no question, regardless of those figures, that the state of Montana does not need 1400 megawatts of power. We do know that even your percentage of units 3 and 4, the 30 percent, is way beyond the amount of power that Montana Power Company would need; and, therefore, we think, as we said in the recommendations and as I said in my statement, that there are alternatives to meeting that need. And we think they are reasonable alternatives.

Q Are you aware that in 1978 and '79 the applicants showed a deficiency of 407 megawatts of average energy?

A Four hundred and seven megawatts of average energy in '78-'79?

Q Right. The applicants in this case -- the five combined applicants.

A Oh. That doesn't, I believe -- well, of average energy?

Q Yes.

A I think Mr. Shah's testimony would contradict that.

Q But isn't it a fact that there is a deficiency in the five applicants' service areas, commencing '78-'79, would you stipulate to that?

A As I recall the figures from Mr. Shah, there was no deficiency in the applicants' service area except for one year, and I'm talking about average energy of 126 megawatts.

Q In what year does that occur in the opinion Mr. Shah had?

A I don't recall; I think it was about 1980 or thereabouts.

Q You will stipulate, then, that in 1980 or thereabouts, even according to your own expert, there is a deficiency in the five applicants' service area?

A For one year; that's the testimony of Mr. Shah, yes.

Q On page 8 you start talking about alternatives. And on line 20 you say, "More and more evidence continues to accumulate showing alternatives to the proposed project are reasonable from an economic standpoint and will have less significant and less adverse impact." What evidence are you referring to?

A Well, the recent studies that we've seen done, some not so recent; but, I guess every study I've looked at, and I've tried to look at all sides of this question, of course, because I'm obviously interested in it; and I've seen publications in Electrical World that show that coal shipment is cheaper for small to moderate size loads, and I mean, you know, as I mentioned before you get above 1600 megawatts; FPC has done studies that show that as we mentioned in our impact statement in 1966, they suggest that it's far better to locate a generating facility at the load center rather than at the mine mouth; I believe even Bechtel has reached that conclusion that it's better to do that.

Q The study you are referring to is one in Electrical World; is that correct?

A Yes.

Q Does that study relate physically to the shipment of coal from Colstrip to some point in the Northwest?

A No, it does not, as far as I know. However, I think you've got to look at this from the overall point of view; and that's what we're looking at, is that I've never seen any study or heard of any study, except submitted by the applicants of this proceeding, which suggests that there is any great cost differential between transmission by transmission lines or by unit trains.

Q Are you aware of any study other than the applicants which relates specifically to the shipment of Colstrip coal to someplace in the Northwest?

A Well, we did have one in here by the people who propose to build the Boardman plant.

Q Was that involved with the shipment of Colstrip coal?

A Not Colstrip coal specifically. But I don't see that there's any substantial difference between Colstrip and the other areas.

Q Which Boardman study, what year is the Boardman study to which you refer?

A I believe it was 1972.

Q Are you aware that the study done on the shipment of coal to the Boardman plant in 1975 showed that it was more economical to burn the coal at the mine-mouth rather than ship the coal to Boardman?

A I heard something about it, but I wonder why have they then decided not to proceed with the Boardman plant?

Q You are aware of the 1975 study that shows it is cheaper to burn the coal at the mine-mouth?

A I have not read the study; I have heard it referred to in the testimony. My only question is still, if it's a lot cheaper, has there been any decisions, and I have not heard of any, that they not build the Boardman plant and instead build a plant in Wyoming and ship electricity over transmission lines.

Q The other studies to which you refer supporting your contention that it's better to ship coal, did that study presume the existence of any existing transmission?

A What do you mean, do you mean the railway lines or the transmission --

Q In comparing the shipment of coal versus the construction or the shipment of electrical power by transmission lines, did that study take into consideration the fact that there may already be existing transmission?

A Not specifically that I know of, but our own study did, and so did Westinghouse.

Q Your own study, now what are you referring to there?

A The analysis made by the Department in the draft Environmental Impact Statement.

Q Was that based on the shipment of coal to someplace in the Pacific Northwest?

A I think we used two approaches. One was I would consider Hot Springs in the Northwest, and yes, we used that.

Q And did it include the escalation of freight rates?

A It did not include an inflationary factor in terms of the escalation of freight rates, but then, neither did the Westinghouse study which was done by Westinghouse.

Q These studies that you refer to that relate to the general comparison of shipment of coal versus transmission, what BTU coal was the basis for that study?

A I don't recall. The studies, you know, talk about coal from different areas; but some of them have talked about Wyoming coal, which, I suppose, is in the neighborhood of 9,000 BTU or something like that.

Q The study that you refer to here in your statement, I think, is the same one you mentioned from Electrical World; did that include an assumption that you would cross the Continental Divide?

A I don't know that it did. However, it seems to me that crossing the Continental Divide affects both transmission lines and railway shipments, or could. Certainly, if your cost for railway are going to go up, at the same time if you are comparing the transmission costs, I would anticipate that the cost of putting the line in would be considerably more expensive going across the Divide and going through mountainous areas than it would, perhaps, going east.

Q Are you saying, then, you think it's more expensive to run electricity up a hill than it is to run a train?

A Very good, Jack; very good. Do I have to answer that one? If I do, I'll take a break just to get a match here. (Pause.) Do you want me to answer that question?

Q Yes.

A I'm not saying that it's going to cost more to run electricity.

Q In your study the Department did on the comparison of shipped coal versus transmission, did you consider the construction of the 500 kV lines in Montana would be an advantage in that they would eliminate the need for construction of other transmission lines in Montana?

A We considered that, but we also considered that if a smaller plant were built somewhere in Montana to provide for the needs of Montana Power, that not even a 500 kV transmission line need to be built.

Q Did you consider the advantages that the 500 kV transmission system would provide to the Montana Power Company as well as to the other utilities in the Northwest, in terms of reliability and advantages of exchange of power?

A Well, certainly, in terms of reliability. And, as you know, I think one of the things we mentioned in the Environmental Impact Statement, in terms of reliability, we thought that shipment of coal might be a preferable way to go because you can store coal at the load center, whereas the transmission lines, the 500 kV lines, go across an area that has experienced earthquakes in the past and are likely to experience them in the future. In fact, as you know, if you were in Helena a few days ago, we had a small earthquake here. And so --

Q Did it knock over any transmission lines?

A Not that I'm aware; of course, you guys don't tell me everything. I think that that's one of the problems that we considered was the reliability of the delivery of the coal or the energy to the load center; and it was our feeling, and it has been expressed by some other studies, that you do have more reliability because you can store approximately 90 days of coal at the load centers. So if anything happens to the railway line, you've got 90 days to repair it. If anything happens to the transmission line, the power is out -- gone.

Q Well, did you consider the effects of reliability with the railroad, such as the prolonged work stoppage or a destruction of the railroad, either because of a natural or a man-made disaster?

A Well, certainly that kind of thing, not the labor stoppage but the natural disaster and those kind of things, are possible with transmission lines; and so in those kind of terms, or sabotage, if that's what you're talking, I think we've experienced in this country more sabotage with the guarded transmission lines than we have with railways in the past.

Q Aren't you aware that the utilities in the planning of their transmission systems generally tried to build in reliability so that if they lose one line, they can still get the power out over other lines?

A Sure.

Q Another alternative you discuss is the use of the slurry pipeline. Do you know how many slurry pipelines there are now in existence in the United States?

A Well, we know of one fairly long distance slurry pipeline.

Q And where is that?

A I believe it's in Arizona or Nevada.

Q And how long is it?

A I think it's about 120 miles long -- 170 or something like that.

Q Wouldn't you say, then, that the studies which indicate that slurry pipelines is cheaper, is pretty much theoretical?

A Well, certainly we don't have a long distance -- by that I mean a 4-500 mile slurry pipeline to evaluate this in terms of economics; but it seems to me that Bechtel has concluded that slurry pipelines are by far cheaper than any other mode of transportation of energy, including transmission lines. And although we have some differences with Bechtel on a number of points, as we've indicated in this hearing, I'm glad to see that their analysis coincides with ours in this case.

Q I guess your answer is that you think those studies are pretty much theoretical?

A I think that certainly -- I feel that Bechtel has enough engineering data to come up with a pretty good conclusion.

Q Are you aware that there was a slurry pipeline proposed from Wyoming to Arkansas?

A Oh yes.

Q Are you aware that that slurry pipeline is opposed by a great number of people?

A Sure, it's opposed by the Western Governors Regional Energy Policy on it.

Q Why is it opposed?

A Because they want to take a look at the impact of the withdrawal of the water used to slurry the coal.

Q Do you know whether the utility would have the right of eminent domain to construct a slurry pipeline?

A No, I don't know that. I don't know whether they would or not. I understand that that is the problem in Congress, that some of the slurry pipeline companies do not have the right of eminent domain.

Q Would it surprise you if I said that utility companies do not have the right of eminent domain for slurry pipelines?

A No, you don't have the right of eminent domain for transmission lines either until it's approved by the Board of Natural Resources.

Q Well, even assuming that a slurry pipeline were approved by the Board of Natural Resources, would a utility have the right of eminent domain for a slurry pipeline?

A You've already answered that; you already told me they don't, because a slurry pipeline wouldn't come under the Utility Siting Act.

Q Well, in other words, you would agree that the utility does not have the right of eminent domain for a slurry pipeline?

A You're the lawyer and you're telling me that, because I have --

Q Do you disagree with that?

A No, I won't disagree.

Q Are you also aware that under the Montana Water Use Act, the use of water in slurry pipeline is prohibited in Montana?

A Well, that's not exactly true, but for transport of coal outside the state it is true, yes.

Q Are you recommending, as an alternative, the use of a slurry pipeline from Montana to out of state?

A I think that's a recommendation. What we're recommending in our statement is that slurry pipeline appears to be a far less water consumptive approach to shipping coal than burning. In fact, I think the figures are somewhere around -- they use an eighth as much water as you would in a generating facility to get the same amount of energy.

Q So you are suggesting then --

A No, let me finish. There are some advantages that appear to slurry pipeline. What I'm saying is that if the studies are done and their conclusion is, and the studies are ongoing, we have to look at the effect on railroads, too -- if studies conclude that that is a desirable way to go, I'm sure presentation can be made to the Legislature and that it will be considered by the Legislature and perhaps the law will be changed.

Q Well, are you proposing, as an alternative to units 3 and 4 and their construction by 1980 and '81; are you proposing as an alternative to that, the construction of a slurry pipeline from Montana to somewhere in the Pacific Northwest?

A No, not at this time. Our emphasis is on the use of unit trains, because that is a readily available mode of transportation.

Q Are you aware of the study done by the applicants by Mr. Pettibone, which shows that the transmission of electricity from Colstrip to the Pacific Northwest by transmission lines, is far more economical than shipment of coal from Colstrip to the Pacific Northwest?

A No.

Q You're not aware of that study?

A No.

Q Then you don't have any reason to disagree with that study?

A Oh, yes, I do.

Q Without even being aware of it, you disagree with it?

A I disagree with it just on the same reason I disagree with some of the reasons on conservation. I have seen no studies, including our own, including the ones done by Bechtel, and including the ones done by the Federal Power Commission and the publication in Electrical World and elsewhere, that conclude that the shipment of coal is more expensive or at least not close to the shipment by transmission.

Q But, again, those studies do not relate to the shipment of coal from Colstrip to a point in the Pacific Northwest, do they?

A Ours does.

Q But it does not include an escalation figure for freight rates, does it?

A No, but all the other general studies do and they reach the same conclusion. I don't know why Westinghouse left that out, but we, I guess, felt it would be better to use the figures that were suggested by the power company in the Westinghouse Study.

HEARINGS EXAMINER: Do you have quite a bit more cross-examination, Mr. Ross?

MR. ROSS: Maybe ten minutes.

HEARINGS EXAMINER: Do you want to finish it before lunch then, or what's your pleasure?

MR. ROSS: I'd just as soon finish it, but it's up to everyone else.

MR. SHERIDAN: I have some appointments with some other witnesses during the noon hour.

HEARINGS EXAMINER: You would prefer that we adjourn until 1:30 then?

MR. SHERIDAN: Right.

HEARINGS EXAMINER: That's agreeable with everyone. Alright, we'll adjourn until 1:30.

RECESS: 12:10.

Following the luncheon recess, the hearing reconvened at 1:30 P.M. on February 19, 1976.

HEARINGS EXAMINER: Proceed with your cross-examination.

CONTINUATION OF EXAMINATION OF GARY J. WICKS

Cross, by Applicants,

By Mr. Ross (Continuing):

Q Mr. Wicks, on page 9 of your statement, beginning at line 19 you suggest that the applicants have not pursued alternatives. Are you aware that the Montana Power Company conducted a study which compared the construction of one 350 megawatt plant for its own use by 1980, and another 350 megawatt unit in the latter part of the '80's, comparing that to the construction of units 3 and 4 on a joint basis?

A In terms of what? Costs?

Q Yes, in terms of cost that they made that comparison: two 350's with Montana Power single ownership versus the proposed units 3 and 4 with joint ownership?

A I have not seen that study. Was it submitted to the Department?

Q The answer is yes. Would it surprise you --

MR. SHERIDAN: I'll object. That's a misrepresentation to the witness.

HEARINGS EXAMINER: Well, I think he can explain. I don't know whether it was or not.

Q Is it your testimony, Mr. Wicks, that neither you nor members of your staff have been presented with that study that I just described?

A I myself have not seen that study. I have seen reference to a 350 megawatt plant. Of course, it was contained in the April, 1974 long-range plan and was withdrawn in May of 1974. Whether it was due to that study or not, I don't know.

Q Would it surprise you that the results of that study show that it's approximately $5,000,000.00 a year cheaper for Montana Power and its customers to go with units 3 and 4 rather than go with the alternate plan of two single 350's with Montana Power ownership?

A Would it surprise me?

Q Yes.

A Yeah, I think so.

Q Why?

A Because of the -- some of the information that I have had, or discussions I have had with some power plant engineers since our recommendation was made.

Q Well, again, Mr. Wicks, could you tell us specifically what studies or what engineers?

A Yes, he was an engineer with the Saskatchewan Power Corporation, and they said that they'd done studies and they found that economies of scale, if that's what we're talking about, generally leveled off at about 500 megawatts.

Q Have you made any studies of your own on the cost of units 3 and 4 versus two smaller plants owned solely by Montana Power Company?

A On the specific costs?

Q Yes.

A No, we have not.

Q Are you aware that the applicants in September of '72 did a study comparing mine mouth generation at Colstrip versus shipping coal to the Boardman area?

A I am not aware of that specific study.

Q Would it surprise you that the results of such a study show that it is cheaper to build mine mouth generation at Colstrip?

A Yes.

Q Why?

A Because of the references I made this morning to the general studies that have been conducted, all of them showing that, at worst, the costs are comparable; at best, the alternative of shipping the coal is more economical; that these studies also included the -- an inflationary factor, and our own studies showed that it was cheaper to, or at least comparable, to ship by coal, and probably -- not probably, was, more energy efficient to ship by rail than it is by transmission lines.

Q I think you told me at the outset of your testimony yesterday, and I think it's in your written statement, that we have to evaluate each application as to its specific circumstances.

A Yes.

Q Now, isn't it correct that the studies you're referring to, here again, are general studies and not applicable to Colstrip units 3 and 4?

A Yes, but we've done a specific study, as I mentioned this morning, and there is no reason from the information we gained in the specific study to believe the general studies are incorrect, or vice versa.

Q Are you aware that the applicants are constructing other plants in the northwest, or tried to construct other plants in the northwest, other than Colstrip 3 and 4?

A I believe it was mentioned in your ten year plan, yes.

Q You say on page 9, at line 25, that there's been no major effort at conservation?

A Yes.

Q Are you aware of campaigns by the appplicants on radio and TV to encourage the efficient use of electrical energy?

A I am aware of Montana Power's campaign. I've, of course, seen it on TV, but in my judgment that is kind of cosmetic conservation energy effect. I think that Montana Power has been remiss in not adopting some programs that have been adopted by other utilities in the nation in their conservation effort.

Q Can you give us some examples?

A Sure. Comparing the energy efficiencies of different appliances, and advising the consumer on that; information on heat pumps, which we know are, even in this area, far more efficient than the normal heating systems in homes; advice on what kind of appliances should be installed in new homes to make them more energy efficient, and what level of insulation should be included. There's been no attempt to restructure rates, that I know of, by the power company, to make it more economical for people to save energy. There has been no information that I've had that the power company has urged the federal government to adopt a rigorous conservation program. There has been no information passed on to our department in suggestions as to what might be done in a conservation program. There have been no inquiries, that I know of, with the Department, as to what its ideas might be as to a conservation program that could be effective. I have not seen any of those things. The only thing I have seen is the commercials on TV urging you to close your refrigerator door.

Q It would surprise you, then, that representatives of the applicants have had discussions with industrial customers on how to save energy?

A It wouldn't surprise me, in view of what I think is the obligation of the company, and I think that's commendable.

Q It wouldn't surprise you that they've had discussions with customers and provided them information on how to save energy with the use of different appliances?

A On all residential customers, is that what you're talking about?

Q Yes. They've had information available for customers?

A Oh, yeah, I've seen that. Turn your thermostat down, and that kind of thing, is that what you're talking about?

Q Would it surprise you that they've also provided information on energy conservation in home heating?

A In terms of insulation?

Q Yes.

A I've seen that, yes.

Q What more would you do, and how many megawatts of energy would that save through such a program?

A What more would I do? I think that I would be more specific on the type of appliances that save energy. Some of the programs that are going on in other states direct the people to the type of appliances that save energy, as compared, if you take an air-conditioner, as to what is the most energy efficient, and there are considerable differences, I understand, between the type of air-conditioners you use. Heat pumps have been around a long time. I think the company could reasonably urge, or at least demonstrate to the people, which we're trying to do in the alternative energy program, that heat pumps are a cheaper way of providing home heating in new homes. I think they should take a look at rate considerations. I think they should take a look at rebates for energy conservation efforts on the part of individuals. I think that they should be urging the federal government to adopt pretty rigorous energy conservation programs. And I think that they should be working with our department, or with the Public Service Commission to set out a program for Montana.

Q Have you done any study that would show how many megawatts could be saved beyond what is being saved with the conservation programs now being carried on by the applicants?

A Have I seen any studies?

Q Have you or your department done any studies? You indicated that you thought that more ought to be done. Have you done any studies which --

A We haven't done any studies ourselves. We've certainly reviewed some of the literature on it. As I mentioned in my statement, it seems that the conservation efforts of other states, in some cases, other localities, Los Angeles, such as I mentioned today --

Q And that's the one that had conservation with the threat of fine if it wasn't carried out?

A I don't think that that was -- there was a threat of higher costs if they did not conserve energy, that is for sure, but I don't think there was a threat of a fine. I'd like to finish: as I indicated in my statement, the federal government has embarked upon an energy conservation program that's pretty rigorous, and have reduced energy consumption by about 28%. And, as I mentioned in my statement, I don't think that that kind of reduction is necessary, but if we can even accomplish a 5 or 6% reduction in the use of energy in the Pacific Northwest, we're talking about a considerable saving in energy and, perhaps, one method of eliminating the need for Colstrip units 3 and 4.

Q Do you recall that I showed you Pike's Exhibit C this morning, which is a letter from the Bonneville Power Administration --

A Right.

Q -- where it said that they doubted if even a very successful voluntary conservation program would be adequate to manage the forecasted electrical energy shortage in the northwest; isn't that correct?

A We're not maintaining that it would eliminate the so-called energy shortage in the northwest; what we are saying is that it would help reduce the need for some of the additional plants. And in respect to the statements made by the individual -- I forget his name -- of Bonneville Power Administration, it depends on what you're talking about volunteering, and I don't want to get into that argument again, or that discussion, but I would say that if you gave people the option of saving money if they saved energy, I think that most people would adopt that option and you would see a pretty significant effect in the conservation of energy.

Q Well, you don't know for a fact, do you, that the applicants are not conducting conservation programs which consist of radio and TV, information available on home heating, appliances, and have had discussions with industrial customers; you don't disagree with that, do you?

A I've seen the ads on TV.

Q Do you doubt that they have not had discussions with industrial customers on how to save energy?

A I don't doubt that, no. In fact, I don't know about Montana Power, but some of the discussions that have been carried on in the Pacific Northwest are turning out to be very effective in saving energy. Some of the aluminum companies which are high energy users in the Pacific Northwest have gone to new types of processes that save up to as much as a third of the energy that is required under existing systems.

Q Well, other than urging the federal government for a conservation program, and other than the restructure of the rates, is there anything that you would suggest the power companies do beyond what they're not doing now to conserve energy?

A I don't think their programs have been vigorous enough. I think that restructuring of rates is an important part of a conservation program and has to be looked at. I also think that the other thing that's important is better public understanding that conservation is one of the goals of this -- has to be one of the goals of this nation in achieving some kind of solution to the energy problem. And I think that more effort should be made to make the public aware of that.

Q Do you think it's better for a utility to forecast too high or too low, and of course, the best thing is to forecast right on?

A Right.

Q Do you think it's better to forecast too high or too low?

A It depends on the circumstances. Are you talking about generally?

Q Yes.

A Well, I think that it would best to be forecasting too -- right on. I believe that, from my limited knowledge of the forecasting method used by the utilities, that they would probably, apparently, forecast too high, and so that there is some factor there for uncertainty.

Q What evidence do you have that the utility companies have forecasted too high?

A Mr. Shah's testimony.

Q What about their experience over the past 20 years?

A 20 years?

Q Yes.

A We're in a different kind of situation over the past 20 years, Mr. Ross, and things have changed --

Q Well, the question was --

HEARINGS EXAMINER: Let him answer, Mr. Ross. When you ask him a question, let's let him complete the answer, please.

A What was the question, again? Oh, okay. Over the past 20 years, circumstances have changed in the last very few years to suggest that perhaps the system used over the past 20 years is incorrect and that some other factor should be taken into consideration, such as the impact of increased prices of energy, electricity, on the demand for energy.

Q And shouldn't you also take into consideration the increased price of natural gas, also take into consideration the increased use of sprinkler irrigation, also take into consideration the increased use of the co-op's; aren't those factors that are in the future that you should also take into consideration?

A Obviously, and as we've said before, the -- we've been over that -- the projections that we used for our decisions are Montana Power projections, and I assume that Montana Power has taken those things into consideration.

Q That's just an assumption on your part, is that correct?

A Well, I would hope that they would take those things into consideration, that they would try to anticipate load growth and that kind of thing, and make a judgment on that. That's their responsibility.

Q Do you know of any plants in the Pacific Northwest for which the construction schedule could be accelerated to meet the 1980-81 deficiencies?

A If I recall, I'm not certain on this, but I think, perhaps, the Jim Bridger plant would be one example.

Q What basis do you have for that?

A Well, the announcement, I believe, in January of last year that the construction schedule had been delayed, so I presume if it's been delayed, it could also be speeded up.

Q When do you think it could be completed?

A The Jim Bridger plant?

Q Yes.

A I don't remember those figures, but I think they delayed it by a year or so, various units.

Q On page 10 of your statement, at line 24, you say there are fewer overall impacts with transporting rather than mine mouth. What studies do you have to support that statement?

A Well, the one that comes to mind is the study done by the Radian Corporation for the Council on Environmental Quality.

Q What did that study relate to?

A It related -- they took a specific coal plant in the Colstrip area and did the evaluation, I believe, with shipping coal to Chicago.

Q Did it take into consideration the burning of diesel fuel as being a scarce commodity?

A I belive their conclusion was that it was more energy efficient to -- also less environmentally damaging, but also more energy efficient to transport the coal by rail rather than by transmission lines.

Q On page 11 of your statement in the second paragraph, you discuss jobs as a result of railroad employment.

A Yes.

Q Isn't it correct that those jobs are a result of full production, which excludes any coal for units 3 and 4?

A Right. These are jobs that have come about by the necessity of transporting coal -- not the necessity but the practice of transporting coal -- outside the state of Montana.

Q Do you have any assurance that if Colstrip units 3 and 4 are not built at Colstrip, that the coal will be shipped to a location in the Pacific Northwest?

A Not in the Pacific Northwest, but we do -- it's my opinion, conviction, in fact, that we're going to see a fairly large-scale increase in coal production, and that the coal will be shipped out. Now whether or not it comes from Colstrip is -- I don't have any definition on that, but the probability of it coming from that area, I think, is pretty great. And I think that the long-term jobs coming from the shipment of coal out are going to be of tremendous benefit to the state, and I think that that is an alternative that should be looked at.

Q But you have no assurance that as an alternative to building a plant at Colstrip, there would be coal shipped to the Pacific Northwest, do you?

A I have no assurances, but if you're telling me that there is a need for energy in the Pacific Northwest, they're obviously going to have to get it from someplace, and if the -- certainly the coal in Montana and Wyoming would be one source of that energy.

Q You're not aware that utilities in the northwest have other options such as building their own nuclear or shipping coal in from Canada, or even Alaska?

A Well, if they do have those options, I'm sure that there are other options available to the production of electricity. In fact, that's our whole point in our recommendation on 3 and 4, is that there are other options for the availability of electricity.

Q What options are available that would provide energy by 1980?

A I think that the option that we've advocated, at least in the Montana Power system, is the building of a smaller plant more in line with the needs of the Montana Power applicant. The other options, I think, that are available are conservation in the Pacific Northwest, and the construction of a plant in the Pacific Northwest that would provide the energy that is apparently needed there.

Q You're aware that there is testimony in this record that Montana Power could not build a plant on their own that would be ready to meet the loads in 1980 and '81?

A I'm aware of the -- that those claims have been made. I'm also aware that the -- your own projections of growth would suggest that you certainly don't need 420 megawatts of energy by 1980. You will not need 420 megawatts of energy by 1985, and therefore, we may look at an alternative such as a gas-fired turbine, or something else along those lines, that could be used until the plant is constructed to provide the long-term needs of Montana, or at least through the period that we're talking about.

Q Well, even assuming that your statement is correct that Montana Power does not need the full 420 megawatts the first year that unit 3 and unit 4 are scheduled, don't you think that it makes sense to build a plant that will meet not just the first year's load when it comes on, but possibly meet a load which comes in subsequent years?

A Oh, absolutely.

Q And don't you think that the use of gas turbines is contrary to federal policy to use coal rather than oil?

A I think that the federal policy is to use -- the long-run policy in terms of between now and the year 2000 is to use coal, but what I'm saying, Mr. Ross, is that the type of alternative we're suggesting is only an interim solution that would carry Montana Power past the time it needs the heavy -- it says it needs heavy energy demands, and is more in line with what they project their needs for energy are. You said something about continuing, or making energy availabile for long-term needs. Nowhere that I recall seeing in your long-range plan, or anything else, do you need 420 megawatts of energy that goes out to 1985.

Q On page 11 at line 22, you give some figures on the amount of SO_2 and particulates. Where did you get those numbers?

A Those were computed from our EIS.

Q Do you know that, in fact, the Board of Health findings have numbers that are much lower than those?

A I don't recall the Board of Health findings. Our EIS was done under the assumption that, as it had to be, I believe, that you're going to use all kinds of coal in that area. We did not understand, or did not have information at that time, as to what the removal efficiencies would be. We knew what the contracted, or the proposed contracted removal efficiency would be, and those figures are based on the information we had at the time we reached our conclusions on 3 and 4.

Q The air standards -- are you aware that in establishing the primary and secondary air standards, that there was much testimony on what those levels should be?

A I wasn't involved in that discussion. I presume that there would be much testimony involved as to what the standards would be. I would presume that.

Q On page 14, beginning at line 15, you refer to water permits. Were any of those water permits issued from the Yellowstone River?

A Oh, I'm sure they were, yes.

Q How much?

A I don't remember the exact figures.

Q Would you please provide those figures?

A Sure.

Q Do you think that utilities, including both the private and public utilities, can do an adequate job of planning for energy needs?

A No.

Q Are you aware that there are several planning organizations in the northwest consisting of both private and public utilities?

A Yes, I'm aware of those -- some of those agencies, but as I recall, some of the concerns that the legislature thinks are important have been incorporated in the Utility Siting Act. There's no involvement in the state, at the state level, on either of these parts, except through the Utility Siting Act, and then we're handed a decision to be made. I think it would be a lot better if there were more cooperation between utilities and state agencies that have these responsibilities in trying to meet the energy needs in compliance with the laws of the states, and also to assist the utilities in meeting those needs.

Q On page 15, you discuss MHD. Do you think that it is an alternative to Colstrip units 3 and 4?

A Not immediately. It's not an alternative, and I think that's our point, is that the technology is developing rapidly enough that we should not make irreversible commitments to a plant like 3 and 4 at the present time, because there appear to be technologies coming along that will increase the efficiency and the use of coal, cause less environmental damage, use less resources, and what we're saying in our recommendation on 3 and 4 is that if we went to a smaller plant we would not be making those irreversible commitments of resources for the transmission lines and the plants, and that we could avail ourselves of this advanced technology somewhere along in the mid-1980's.

Q Would it surprise you that the latest information from EPRI, the Edison Electric Institute, is that MHD cannot be available until at least 1992?

MR. SHERIDAN: Objection. Assuming facts not in evidence.

HEARINGS EXAMINER: Overruled.

A Would it surprise me? Yeah, it would surprise me because I've had a number of discussions with Mr. Jerry Plunkett who is head of the MH institute in Butte, and from my understanding, one of the most knowledgeable people in the country on MHD, that's the reason he was hired for the job, and he believes that we can have a demonstration plant by the 1980's, and start using the power by 1985. He thinks that the probability is pretty good. And, as you know, the impetus to that has come from the increased federal funds that we've -- that have been made available for MHD research.

Q Are you aware, Mr. Wicks, that Section 7807 of the Utility Siting Act says that upon receipt of an application, the Department shall commence an intensive study and evaluation of the proposed facility and its effects pursuant to Section 7816 of this act, and it goes on to say that the Department shall then make a report to the Board which shall contain the Department's studies, evaluations and recommendations, and other pertinent documents resulting from its study?

A Is that the question?

Q Yes. Are you aware that that is contained in the siting act?

A Yes. That's the Utility Siting Act before revision this last session, is that correct?

Q Did Mr. Stephen Ayers participate in the Department's intensive study pursuant to Section 7807 of the act?

A That name does not ring a bell.

Q How about Mr. J.R. Forest?

A No, that name doesn't ring a bell either, but there were people participating in the study whom I didn't know.

Q Who hired Mr. Ayers?

MR. SHERIDAN: Let's correct the record. It's Dr. Ayers, a medical doctor, who was hired by counsel.

Q Excuse me. Who hired Dr. Ayers?

A Counsel, I guess.

Q When you refer to counsel, to whom are you referring?

A Both staff counsel and retained counsel. I'm not familiar with Dr. Ayers, so if you'd tell me who he worked for, I'd be better able to answer that question, but our staff attorneys and retained attorneys have authority to hire people.

Q When was Mr. Ayers hired? Dr. Ayers, excuse me.

A I don't know.

Q Do you know whether he was hired before or after your final recommendation was made?

A I don't know that either.

Q Did Dr. John Szablya participate in your department's intensive evaluation prior to making your recommendation?

A I don't remember when Mr. Szablya was hired. He was not hired directly by the Department.

Q Did Mr. Shenker hire Mr. Szablya?

A If he worked for us in this hearing, I presume that retained counsel hired Mr. Szablya, yes.

Q How about Dr. Hammer? When was he hired and by whom?

A I don't know when he was hired, and again, the presumption that he was hired by retained counsel if he worked on this hearing.

Q How about Mr. O'Scannlain? When was he hired and by whom?

A I -- he was hired by retained counsel, and I don't know the exact date when he was hired.

Q How about Dr. Hindawi? When was he hired and by whom?

A I don't know the date, retained counsel, I presume.

Q How about Dr. Alan Morris? When was he hired and by whom?

A The answer is the same as previous. Do you want me to repeat it?

HEARINGS EXAMINER: That won't be necessary. I get to rule on that. Just say, same answer.

Q How about Mr. Timothy Devitt, and Dr. William Brewer, and Dr. Kanu Shah,and Mr. Arnold Cogan? Were they also hired by counsel after your recommendation was made?

A I don't know when they were hired. They would probably have been hired by counsel; yes, they were.

Q And they are all witnesses in this hearing; isn't that correct?

A That is correct. Pardon me, let me retract that statement. I don't know that all of -- all the names that you listed, I don't know that they've all been witnesses. Some of them have been.

Q Did any of the gentlemen who I named participate in the draft EIS study of the Department?

A Not to my knowledge.

MR. ROSS: No further questions.

HEARINGS EXAMINER: Redirect, Mr. Sheridan?

Redirect, by Department of Natural Resources and Conservation,
By Mr. Sheridan:

Q Mr. Wicks, would you turn around and look at that blackboard there with a number on it? It says, Montana coal, 107 billion. That's tons, isn't it?

A Right.

Q Mr. Ross was asking you some questions about options for availability of coal. Now, would you, as the director of the Department of Natural Resources and Conservation, or as even a businessman, consider it a rational business decision for Montana Power Company, or its wholly-owned subsidiary, Western Energy Company, to sit on that coal and not sell it to other utilities if they don't get 3 and 4 built?

MR. ROSS: Objection, leading.

HEARINGS EXAMINER: Let him finish his question.

Q -- if they don't get units 3 and 4 proposed?

HEARINGS EXAMINER: Now, don't answer until Mr. Ross makes his objection.

MR. ROSS: Objection, suggestive and leading.

HEARINGS EXAMINER: Overruled.

A Would I believe it was a good thing? I think it would depend on the circumstances, but I would say that, in general, it appears to me, and I'm convinced that the Montana coal is going to become far more valuable in the near future.

Q If Western Energy Company or Montana Power Company failed to sell that coal, or refused to negotiate for the sale of that coal, would that, in your opinion, be in furtherance of the objectives of additional usage of coal?

MR. ROSS: Objection, that's an incorrect statement of the record.

HEARINGS EXAMINER: Take that as an assumption, and then you can ask it, I guess.

Q Would you please assume my previous statement?

A Would you repeat that, Bill?

Q Certainly. Assuming that Montana Power Company or its wholly-owned subsidiary, Western Energy Company, refused to sell, or refused to negotiate for the sale of available coal at Colstrip that was not to be used at Colstrip units 3 and 4, do you have an opinion whether or not the refusal to do so would be in conformance, or be obstructive to, established and recognized federal policy with respect to the use of available coal resources in the United States?

A Oh, obstructive to.

Q I'd also like to ask you some questions on slurry pipelines. First of all, in your opinion, does it represent the maximum efficient use of available resources to transport coal by pipeline using one-eighth the water requirements for the same amounts of coal that would be used in the event Colstrip units 3 and 4 were constructed and operated at Colstrip?

A Well, my opinion, from reading the studies that I have on coal slurry pipeline, is that you deliver a lot more energy with a smaller use of water than by other modes of transportation, and I have heard or read the figure one-eighth of the water would be required to ship the coal by slurry as compared to mine mouth generation of the electricity. I think, and there is no question, I don't think, that, from the studies that I've read, that it is more energy efficient to do that than to ship by transmission lines.

Q Do you have in front of you the January, 1976 power situation statement?

A Yes, I do.

Q Will you mark that DNR Exhibit 30?

(EXHIBIT IS MARKED.)

Q Mr. Ross asked you some questions regarding the January, '76 power situation statement on cross-examination.

A Right.

Q One of his questions involved the increase, or alleged increase of usage over 1975 to 1976 for the coordinated system load. Does that coordinated system load, in your opinion, increase seem to be consistent with allegations made, or claims made, by certain applicants here that their increases are projected at 7%?

A No, it appears to be inconsistent, but those kind of statements, as I mentioned earlier, the coordinated system load was 13.8 below the peak estimate, and 8.3 below the energy estimate for the month of January.

Q And incidentally, based on that 1976 January report, isn't it true that the Pacific Northwest coordinated system total load was 13.8% below the peak estimate at 8.3% below the energy estimate for the month?

A Yes, that's how I interpret the statement made in the paper.

Q And there were certain sales, were there not, to southern California from the coordinated system?

A Right.

Q What was the total amount of sales of surplus energy to the southwest?

A 2,078,255 megawatt hours of surplus energy, of which I would say about, approximately, half of that was delivered by private utilities.

Q What was the figure in January alone of sales by private utilities in the coordinated system to California?

A As I read this, it would be approximately a million megawatt hours.

MR. SHERIDAN: We'll offer DNR Exhibit 30.

HEARINGS EXAMINER: Any objection?

MR. ROSS: I wish to voir dire.

HEARINGS EXAMINER: Very well, you may.

Voir Dire, by Applicants,

By Mr. Ross:

Q Mr. Wicks, the sale that you referred to a moment ago, do you know whether or not they are part of the load?

WITNESS: What does voir dire mean, first?

HEARINGS EXAMINER: Well, I'll explain that. Whenever an exhibit has been tendered in evidence by one side, the other side has the right to ask questions regarding the foundation of the exhibit to establish whether they want to make any objections as to its admissibility, so he is proper in asking questions on it, in my view anyway. Mr. MacIntyre agrees with that decision.

Q Did you answer my question?

A I've forgotten the question.

Q Do you know whether the sales which you refered to, being delivered in the southwest, whether or not they are considered as part of the load?

A You mean the estimated energy demand?

Q The 2,078,255 megawatts that were sent to the southwest.

A Is considered part of the load?

Q Yes.

A Well, I guess I don't understand what we're talking about load here. You mean the estimated load, or part of the load that was actually generated?

Q What does the 2,078,255 megawatts -- do you consider that as part of the BPA load?

A No. I wouldn't think so. I would presume that, at least as far as BPA is concerned, and that's the 1,147,000 megawatt hours, that that would be, I guess, what they call block energy, that would be part of the load, but not part of the estimated demand.

Q Can you identify on this document what the increase in the coordinated system load was for average energy?

MR. SHERIDAN: Is that proper voir dire?

HEARINGS EXAMINER: Well, if you're going to offer the document through this witness, I suppose it's proper to find out if he can tell us what some of the items on it are, so I would consider it proper. If he knows, or if he doesn't know.

A If I can tell you what percentage the coordinated system load is increased, is that the question?

Q Yes, during the last year.

A Well, it says here that as a percent of same month last year, it has energy 105 and peak 101.9. Now I am not sure whether that includes the energy that they have sent out of the area or not. I just don't know the answer to that question.

MR. ROSS: No objections.

HEARINGS EXAMINER: It will be admitted.

Redirect, by Department of Natural Resources and Conservation, By Mr. Sheridan (continuing):

Q Incidentally, Mr. Wicks, Mr. Ross was asking you questions in millions of megawatts. Those are megawatt hours, are they not?

A Yes, they are megawatt hours, right.

Q Mr. Ross asked you some questions regarding the loss of demand from the Anaconda Company in Butte. Is it your understanding that that loss of demand is a result of the unavailability of energy, or a reduction in the price of copper?

A Well, I think the answer is pretty obvious, that it's the reduction in the price of copper that has reduced the demand for electricity.

Q Are you aware of the similar situation for the aluminum industry?

A Yes.

Q Mr. Ross asked you some questions regarding voluntary conservation. I won't ask you to define it for purpose of getting out of here by Friday, but in his questions to you regarding Lt. Governor Christianson's comments, was it your understanding that Lt. Governor Christianson testified that voluntary conservation was not working?

A No. My understanding was that voluntary conservation, perhaps, wasn't -- of his testimony, was that voluntary conservation was not working, perhaps, as well as some people had anticipated.

Q In terms of energy per capita, is it your opinion that the goal Montana and the rest of the nation should set is to reduce the energy per capita requirements?

A Yes.

Q Why?

A Well, I think that, as I outlined before, just the savings in terms of capital, it would free up capital to be invested in other job-creating industries. The savings in resources, the lack of necessity of burning our coal resources, and that kind of thing, would be saved by conservation at least to a degree, and I'm well-aware -- not well-aware, but aware, certainly,of studies that demonstrate that other countries in Europe and elsewhere have almost comparable standards of living, but yet utilize on a per capita basis a lot less energy. West Germany, as I understand it, uses about a half the per capita energy that we use in this country.

Switzerland uses one-third, and as again I say, with almost comparable standards of living. Therefore, I think that as a number of the studies have suggested, the federal energy administration study, there can be substantial cuts made in the energy use in this country without affecting either the standard of living, or the employment and growth possibilities for the country.

MR. SHERIDAN: Thank you. I have nothing further.

HEARINGS EXAMINER: Mr. Ross, do you have any re-cross?

Re-cross, by Applicants,

By Mr. Ross:

Q Do you know, Mr. Wicks, whether the figures on DNR Exhibit 30 have been normalized, or whether --

A I would presume they have, but I don't know that for a fact.

Q Would it surprise you to know that they have not, and if they were, the percent increase shown on DNR Exhibit 30 would be much higher?

A I would be surprised if they didn't include some normalizing affect in their energy estimates, yes.

Q You testified that through energy conservation that would free up capital to invest in other projects. When the other projects are developed, isn't there a possibility that they're going to need energy?

A The other projects? Yes, and that's the thing that I -- the objective about conservation that I think is most worthy, is that not only do you free up capital for investments in other forms of job-creating industries, but you also free up energy that otherwise would be used in waste, essentially.

Q Well, doesn't that result in an increase in demand for energy?

A It may, yes.

Q So, in other words, as we conserve and put it into other projects, we're going to need more energy, right?

A No. Our position -- you're trying to misconstrue what I've said again. Our position is, as it's in the EIS, and in the statement, that we recognize the need for more energy. It's obvious if you save some energy, that you're going to be able to create more jobs that require energy, with only the same amount of generation. If you save 50% of a plant, 50% of that energy could be used for other job-creating industries. What I'm saying, Mr. Ross, is that if we follow a conservation policy, this nation will be able to grow more rapidly than it has in the past with almost the same amount of use of energy. That's what I'm saying, and we can create the same number of jobs, have the same capital, or more capital investment, with the same use of energy.

MR. ROSS: No further questions.

HEARINGS EXAMINER: Anything further?

MR. SHERIDAN: Thank you.

HEARINGS EXAMINER: Very well, you're excused, sir.

(WITNESS IS EXCUSED.)

HEARINGS EXAMINER: We'll next call the public witnesses we have here. Mr. Norsworthy?

JASE O. NORSWORTHY, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Mr. Norsworthy, your statement will be received in evidence, and as I've explained, we won't re-read it into the record since we'll -- it'll be transcribed to go to the board anyway. So, unless you have something that you wish to add to this statement, we'd let you be subjected to cross-examination.

MR. NORSWORTHY: The only thing I would suggest, sir, is that I have read the position statement of the Billings Chamber of Commerce into my written statement, and I have brought along with me a copy, a signed copy, of that in the event that would be better in the record.

HEARINGS EXAMINER: Very well, we'll let them cross-examine and see, and if you want it attached, you may.

(THE WRITTEN DIRECT TESTIMONY OF MR. JASE O. NORSWORTHY WAS DIRECTED TO BE INSERTED AT THIS POINT.)

STATEMENT OF JASE O. NORSWORTHY
VICE PRESIDENT, BILLINGS CHAMBER OF COMMERCE
BILLINGS, MONTANA

DEPARTMENT OF NATURAL RESOURCES HEARING, HELENA, MONTANA
February 19, 1976

On behalf of the Chamber of Commerce of Billings, Montana, I wish to thank the Department of Natural Resources Board for granting to us time to make a statement with regard to the Montana Power Company's proposed Generating Plants #3 and #4 and the accompanying transmission lines.

A Chamber of Commerce cannot, per se, impose its will on governmental or public authority, but like labor unions, League of Women Voters, taxpayer associations, rural electric associations or any one of several hundred other different groups who hold themselves together because of some common bond, the Chamber of Commerce seeks the will of its members and through some process attempts to make that will known to public authority. In the case of the Chamber of Commerce, and in particular the Billings Chamber of Commerce, we utilize the "position statement". A position statement has meaning only to the extent that it is a strong concern of the membership, is based on a fair weighing of available information, and is directed to a

continued

public authority sensitive to, and with a desire to be responsive to the community making its position known. The Billings Chamber of Commerce is vitally interested in Colstrip's #3 and #4 and the appropriate forum to hear of our interest and concern is this board; and we appreciate your weighing the position of the business community of Billings. For we, as a chamber, feel that outside of Colstrip and possibly Forsyth, no community stands to be affected by these plants more than Billings; and, although this effect could be viewed as either positive or negative, depending on ones position, the Billings Chamber of Commerce has chosen to cast its lot to the positive effect side.

This effect will be felt in a number of ways, among them being population increase and corresponding increases in taxable valuation, and demand for both public and private services. We feel these can be and, if prepared for, will be, for community betterment. We realize there are those who in all honesty can say the effect of this is negative. On the other hand, we as a Chamber do not possess the wisdom to know how to stop progress--how to tell the next family it cannot move into our midst. We can only say, let's try to be prepared. Billings is now, and has for some time, been in a growth cycle. Why--is the question. We honestly don't know, but our economy is strong. It is based on no single industry as are a number of other western communities.

continued

Maybe this has been one of the major factors in the "Magic City's" growth. We, and we would hope the state, would like to see it remain that way. A major energy source, close to Billings, will insure for years and years to come a stable source of energy upon which the community will undoubtedly rely, and to which desirable industry can be drawn. Unemployment in Billings was at 4.2% in October, 1975, (the latest figures available to me). They were the lowest reported in the state. We, and again we would hope the state, would like to see that figure lower, and with a strong economy with stable energy sources, we feel it could be, even under continuing growth projections. Even though we have the lowest unemployment in the state, it is undeniable that an expanding community generally has unemployment higher than it ordinarily would because it attracts to itself the unemployed from other areas. This suggests that our local unemployment situation may even be better than the figures indicate. If so, we and we hope the rest of the state, see expanding employment opportunity fed by a stable energy source as desirable to our community, our state, and our youth who continually and annually enter the labor market.

I would like, at this time, to read into the record the Position Statement of the Billings Chamber of Commerce:

continued

POSITION STATEMENT

Billings Chamber of Commerce Board of Directors

DATE: Friday, January 3, 1975

SUBJECT: Generating Plant 3 and 4 and the Accompanying Transmission Lines-Colstrip, Montana

SUBMITTING COMMITTEE: Board of Directors

STATEMENT OF POSITION:

The Board of Directors, at a special meeting held Friday, January 3rd at 12:00 Noon, unanimously approved a recommendation to support in principle Steam Generating Plant #3 and #4 at Colstrip, and the accompanying transmission lines.

BACKGROUND INFORMATION:

1. The Board of Directors spent two entire meetings considering this question.
2. Several Board members attended the Department of Natural Resource's hearing.
3. The Board heard representatives from the Montana Power Company and the Northern Plains Resource Council state their respective positions.
4. The Board action was based primarily on the following reasoning:
   A. We are facing a critical national energy shortage.
   B. We cannot continue to import oil at the rate we did in

continued

1974 without serious damage to our economy.

C. The only alternative to oil as a source of energy, that is known at the present time, is coal.

D. Because of the need to protect our environment the low sulphur coal from here in the West is the coal that is being used.

E. Because of the above reasoning there seems to be general agreement that our coal will be mined, but a continuing question is whether it should be converted to energy at the mine mouth and transported to it's point of consumption by power lines, or whether the coal should be transported to the load center and converted to energy at that point.

F. It was the Board's reasoning that the plants should be built at mine mouth for the following reasons:

   1. Agriculture is going to consume increasing amount of electricity through the expansion of irrigation.

   2. Expansion of facilities in Billings such as the new St. Vincent Hospital, the Cancer Treatment Center, the Career Education Center, Rimrock Mall, the Multi-Purpose Building, and the Regional Post Office indicate the need for additional energy here in Billings.

continued

G. We already know of the announced curtailing of the supply of natural gas as well as in the entire nation. The only alternatives for natural gas are electricity, oil, or direct burning of coal. And it was the Board's opinion that electricity is the most logical substitute.

H. The Board recognizes that the plant must meet State and Federal air pollution quality standards and therefore, must be within the acceptable range in order to operate, as well as conforming to the State Stripmine Act requiring surface reclamation.

THE END OF THE POSITION STATEMENT OF THE BILLINGS CHAMBER OF COMMERCE

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I would like to add that subsequent to the taking of this position on January 3, 1975, I am informed that the Billings area growth has been greater than was then anticipated. We also know that the 30% F.O.B. mine price tax on coal has the potential for creating enormous tax dollars to the State of Montana if the plants are built at Colstrip, for then, even with this high tax burden, the mines are captive to the four plants and the tax dollars secure for the life of the plants. If, however, the plants are built out of state, the coal for them will be that which is burned at the lowest cost per million BTU under the boilers. With our high tax of 30% F.O.B. mine

continued

price and Wyoming's low one, we might well see the tax dollars go not to Montana, but to Wyoming, for that most likely will be the lowest price coal per million BTU.

We would call to your attention our statement recognizes that the plants must meet State and Federal Air Pollution and Stripmining Requirements in order to operate. The continuation of our position of support demands that these requirements be met.

Finally, we would like to note that this position was taken by the Billings Chamber of Commerce over one year ago and after the opportunity for a year of reflection and anticipation, the position of the Chamber of Commerce of Billings has not changed.

I would like to state for the record that although I am in the natural resource business, my appearance here today is as President-Elect of the Billings Chamber of Commerce. Our President, George Selover, would have delivered this statement, but earlier commitments cast a doubt on whether he could be here today. Thank you for your attention.

HEARINGS EXAMINER: Go ahead, Mr. Doney.

EXAMINATION OF JASE O. NORSWORTHY

Cross, by Department of Natural Resources and Conservation,
By Mr. Doney:

Q Mr. Norsworthy, you're the vice president of the Billings Chamber of Commerce in Billings, Montana; is that correct?

A Yes, sir.

Q On your statement on page 1, I notice you say that -- at the bottom of the page there -- a position statement has meaning only to the extent that it is a strong concern of the membership, etc. How is the concern of the membership of the Billings Chamber of Commerce incorporated into the position statement presented here today?

A I did not hear the --

Q How is the concern of the membership of the Billings Chamber of Commerce incorporated into the statement submitted here today?

A Well, maybe a little bit of the history of how the statement came about -- at our regular board meeting, I believe it was on December 13th of 1974, we had a presentation by representatives of the Montana Power Company to the board, with regard to steam generating plants 3 and 4 at Colstrip, and the transmission lines accompanying those two plants. That presentation was made to our board and, I believe, at that meeting we had a total of twelve directors present out of sixteen, I think it is. Then, subsequently, on January 3rd of 1975, at a special meeting of the chamber board, we had a presentation made to us by the Northern Plains Resource Council representative, and at that particular meeting there were fifteen directors present. A vote of the board was taken subsequent to that presentation, and a position statement then adopted.

Q How many members do you have in the Billings Chamber of Commerce?

A We have, I think, a little over 1100 dues paying members.

Q And were those members polled in any way, or was a questionnaire sent out asking them their views on this position statement?

A No, there were not. If I may explain there, the procedure that we have utilized in the chamber activities, is generally through the position statement. The position statement is adopted by the board on whatever subject matter comes before it. That position is then made public to the members through a publication of the chamber called"The Comment." We generally get feedback as regard to the position statement as to whether or not we have a favorable or unfavorable response. I mean, we can pretty well feel that if you're a board member. In this particular instance, I know of no objection by any of the membership other than, I think it was, either 16 or 19 doctors of the Billings Clinic who sent a letter to the paper and a copy to us, or vice versa, I've forgotten which way it was. But that's the only objection I'm aware of.

Q Could you tell us more about the objection by the doctors? You say 16 doctors?

A Either 16 or 19. This was about a year ago.

Q And they disagreed with this policy statement?

A Yes.

Q For what reasons?

A Mostly environmental, I believe was their -- I have not read it since about a year ago -- but my recollection --

Q How about human health?

A About what?

Q Human health?

A Human health?

Q Were they concerned about injury to humans from air pollution; do you know?

A I cannot recall that there was anything of that nature in the letter.

Q Did you read the statement presented by the doctors?

A Yes.

Q What'd it say?

A Well, I mean, I read it about like a year ago, and I don't recall its total content.

Q And 16 doctors submitted a statement and the board of directors of your organization didn't consider that important?

A This is after we had taken a position. Yes, we considered it important.

Q Did the board take it up?

A Oh, yes.

Q What did the board do about it?

A Nothing.

Q Why?

A We didn't feel it was a strong enough concern from the membership. This was the only concern we saw come --

Q 16 professional doctors objected to this statement, and the board ignored it?

A And the board what?

Q Ignored their position?

A No, we didn't ignore it.

Q Do you have a copy of the doctors' statement with you today?

A No, I do not.

Q Do you have it at home?

A No.

Q Is it in your office?

A I'm sure I could get one.

Q What's the position of the Billings Chamber of Commerce on the air pollution from the Corette station?

MR. ROSS: Excuse me just a moment, Mr. Davis, I'd like the record to show that the previous question regarding the Billings' doctors was furnished to counsel by Mr. Clancy Gorden.

MR. SHERIDAN: Mr. Ross, nearly every question you've asked has been furnished to you by someone else, and I suggest you let the cross-examination proceed without interruptions.

HEARINGS EXAMINER: I guess the record's going to show everything we've said, so go ahead.

Q What is the position of the Billings Chamber of Commerce, Mr. Norsworthy, on the air pollution caused by the Corette plant recently?

A We have not taken a position.

Q Have you discussed it?

A Not at board level. We have an environmental quality council, or task force, in the chamber, but they've not brought anything before the board yet.

Q Are you familiar with the Forsyth Chamber of Commerce?

A With the Forsyth did you say?

Q Yes.

A I'm not, but I'm sure they have one.

Q Why hasn't that chamber appeared yet in support of this plant, 3 and 4?

A I would not know.

Q On page 2 of your statement, Mr. Norsworthy, at the bottom of the first paragraph there, it says the Billings Chamber of Commerce has chosen to cast its lot to the positive effect side. Do you see that? Is that a correct statement?

A Yes.

Q Is the Billings Chamber of Commerce saying there that it is ignoring the negative side?

A No.

Q Where are the negative sides?

A Well, I'm not sure that I can go through the list of what I've just been hearing. I'm sure there is many negative sides as we can all bring to mind. Certainly I think the question of environmental quality, in terms of air pollution, water pollution, things of this nature, are a concern, and were taken into account by the chamber. Likewise, strip mining, reclamation, and things of this nature. I think our statement speaks to this in the standpoint that we're not necessarily that knowledgeable about what those requirements are or ought to be, except that we expect that they should be continued.

Q Does the Billings Chamber of Commerce have a charter?

A A charter?

Q Or by-laws, or articles of incorporation?

A Yes.

Q Is the thrust of those documents that the Billings Chamber of Commerce promotes business in Billings?

A I cannot answer that. I'm not sure that I've read the charter of the Billings Chamber of Commerce.

Q Do you understand the charter to mean that the chamber of commerce should promote the health of the citizens of Billings?

A Yes.

Q And yet you haven't brought with you the statement from the doctors, and your board has ignored that statement?

A No, I'll be glad to supply it to you.

Q I would like to see it. Now let's turn to page 4, Mr. Norsworthy, of your statement, which is the first page of the position statement adopted by your board. The statement of position reads that the board of directors at a special meeting unanimously approved the recommendation to support in principle units 3 and 4. What does that mean, in principle? Could you explain that for me?

A Well, I think that we, as a board, realized from the information that was supplied to us, that there was an awful lot that we did not necessarily know or understand, and therefore, I think we had to say that we couldn't support it necessarily from a scientific standpoint, or a total -- knowing whether or not there was a total need, or demand, for the energy that would be created by the plants. This is something a little bit beyond our knowledge and the scope of our ability to go into the matter.

Q Would it be an accurate characterization to say that Billings would receive the benefits of the Colstrip units, but not the detriments?

A No, I don't think we could say that. At least I would not necessarily agree to that.

Q What are the detriments that Billings itself would receive?

A Well, I think we would see -- I think that we anticipate that we would see population increases, an influx of people, things of this nature that would demand -- place more demands on the community, particularly from a tax standpoint. The goods and services, both public and private.

Q Would the city of Billings be exposed to any air pollution from this Colstrip unit?

A No. Not unless the wind would start blowing the opposite direction.

Q Would it be exposed to any of the problems with water quality?

A Of what?

Q Water quality problems?

A No.

Q Would it be exposed to any of the damages inherent in strip mining?

A Well, other than people associated with that kind of activity who might be living in Billings. We would have a population increase.

Q Isn't it really true that the businessmen in Billings stand to make some money from this project and would take none of the risks inherent in construction of that project?

A I don't necessarily understand that to be a conclusion I could come to.

Q Let's face it. You're not going to be near the Colstrip units 3 and 4, is that correct?

A I'm not going to be what?

Q Near?

A Near?

Q Within a few miles?

A No, we would be like 120 miles, or 25, I think.

Q Let's move on in your statement, Mr. Norsworthy, to page 5, part F, where it states, it was the board's reasoning that the plant should be built at mine mouth for the following reasons, and then there are two reasons, I guess, listed under that. The first one says, agriculture is going to consume increasing amount of electricity through the expansion of irrigation. How does that reason relate to construction of units 3 and 4 at the mine mouth?

A The source of energy would be closer at hand and therefore should be less expensive.

Q What if the plants were built elsewhere, would the energy still be available?

A We don't think it would be available as inexpensively, and we're not sure it would be brought into this general area for this -- to be available for this particular purpose.

Q Have you or the board of directors studied the environmental impact statement compiled by the Department of Natural Resources, or the Westinghouse environmental impact statement compiled by the applicants?

A I cannot answer that.

Q You can't answer it?

A I don't know whether the board members have.

Q Have you personally?

A No, I have not. Excuse me, I have studied parts of it, but not all of it.

Q Have any of your board members attended the hearings?

A I understand they have, yes.

Q Do you know which ones?

A I do not.

Q Do you know that there have been studies done as a part of this hearing concerning the shipment of coal by rail versus construction of these plants and transmitting the power by power line?

A Yes.

Q Do you know that studies show it's cheaper to ship the coal by rail than it is to build these plants and ship it by power line?

A Well, I understand that there's been testimony to that effect. I don't see how it could possibly be so.

Q Have you studied it?

A No.

Q Has your board?

A Sir?

Q Has your board studied it?

A No.

Q Then how can you make that statement that you don't think it'd be cheaper?

A It just doesn't make sense to me that you can ship a bulk product that far that cheap on a railroad for that many years when you just have to move it a few yards the other way around.

Q So, in other words, if we had experts in the United States tell you this problem, you wouldn't believe them?

A This may be true.

Q Mr. Norsworthy, have you ever worked for the railroad?

A No.

Q Do you know how many jobs would be created by shipping the coal by railroad versus building this plant?

A No.

Q Would 330 surprise you?

A Jobs on the railroad?

Q Yes.

A No, it wouldn't surprise me.

Q Do you know how many jobs would be created by the operation of units 3 and 4? Not the construction, the operation?

A No.

Q Would 95 surprise you?

A No.

Q Would it be better to have more jobs?

A Would it not be what?

Q Would it be better to have more jobs?

A Well I think we looked at it in a number of other ways, not just in terms of jobs. I'm not sure that's the limit of jobs that you would have as a result of Colstrip 3 and 4 being in that vicinity.

Q What other ways would you look at it?

A Well, one of the things I think that we have discussed on the board is the fact that if the plants are built at Colstrip, the coal then is pretty much locked in captive to those particular plants. That is the Colstrip coal. We think that's a big tax benefit to the state of Montana that could be lost if we went to the process of shipping coal from Colstrip to a plant in the Pacific Northwest. There's no assurance whatever that we would be able to rely on Montana coal going to the Pacific Northwest.

Q Have you made any studies of that?

A I have, yes. Personally, but not at a board level.

Q Do you have those studies with you?

A No.

Q The second reason on F on page 5 is that expansion of facilities in Billings, and then some are named, indicate the need for additional energy here in Billings. I ask you again, how does that reason reach the conclusion that the plant should be built at the mine mouth?

A We feel that there would be a stable source of energy, ample to cover the growth potential of the community.

Q But if the energy were available for the city of Billings, what difference would it make if the plants are built at mine mouth?

A We feel that it'll be a little less expensive to the community and therefore more attractive to growth potential.

Q But again, you or your board have not studied that, have you?

A Well, I'm not sure what you mean by studied, but we've looked into what it would mean to the city, yes.

Q You've looked into it? What do you mean by that? Besides the conferences you had with Montana Power and Northern Plains?

A Besides what?

Q Besides the two meetings you had with Montana Power and Northern Plains, what else has your board done to look into it?

A Well, I think we're constantly,in board meetings and discussions, at committee levels, at task force levels, we're constantly looking at the way in which the community is growing, and what some of the requirements will be because of that growth, and the potential of that growth. So to this extent, it's kind of an evolving thing that continually goes on.

Q But it's not a professional study that's been done by your board?

A No, and I think this is the reason we, in our statement, said we agreed with this, or supported it in principle.

Q All right. Page 6 G, you say, the only alternative to natural gas, are electricity, oil, or a direct burning of coal, and it was the board's opinion that electricity is the most logical substitute. How did the board reach its opinion that electricity is the most logical substitute?

A Well, we're looking at it in terms of the other available sources, that is, natural gas or oil, both of which are rather limited in quantity in our particular area, and particularly with the reduction in the amount of both oil and gas coming in from Canada, and our particular area, with three refineries, relies very heavily on Canadian imported oil. But with that in mind, and then looking to any other use of coal, so far, coal gasification, liquifaction, or neither of those, is feasible at this particular point in time.

Q But again, has your board done any in-depth studies of this or has your board or yourself read the environmental impact statement?

A No.

Q Moving on the H on page 6, you say the board recognizes that the plant must meet state and federal air pollution quality standards and therefore must be within acceptable range in order to operate, as well as conforming to the state strip mining act requiring surface reclamation. Have you or your board ever heard of the Utility Siting Act?

A Yes.

Q Why is that act left out here?

A We're operating under that particular act right here. This is what we're supporting is the granting of the permit under that particular act.

Q But don't you think that the facility should meet the requirements of that act?

A I think that's what we're saying, that we think that the permit should be issued.

Q Are you aware that one of the criteria in the act is that the facility must be needed?

A Yes.

Q If it were determined by this board that the facility was not needed, would your board be in favor of Colstrip 3 and 4?

A I'm not sure what our board would do at that point.

Q Have they discussed it?

A Sir?

Q Have they discussed it, to your knowledge?

A No.

Q Last, Mr. Norsworthy, I notice on your last paragraph that you say that you're in the natural resource business. I was just curious what that business was.

A Oil and gas, and coal development, that's mainly it.

MR. DONEY: Thank you. No more questions.

HEARINGS EXAMINER: Do you have anything else you wish to add, sir? Okay, thank you very much. Mr. Hansen?

JOHN L. HANSEN, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Do you have anything you wish to add to your written statement?

MR. HANSEN: No, sir.

HEARINGS EXAMINER: Very well.

(THE WRITTEN DIRECT TESTIMONY OF MR. JOHN L. HANSEN WAS DIRECTED TO BE INSERTED AT THIS POINT.)

I am John L. Hansen, President of Cop Construction Company, Box 1938, Billings, Montana. I am appearing as an individual, small business man in support of issuing construction permit for the construction of Colstrip Units 3 & 4.

I am a native of West Yellowstone, Montana. I have been educated in Montana and hold a degree in Civil Engineering from Montana State University. With the exception of military service I have worked and lived in Montana or the surrounding states all of my life.

Our firm bids work in Montana, Wyoming and Idaho. The company efforts are primarily directed to the construction of highway structures, water and sewage treatment facilities, heavy industrial work and irrigation work.

An adequate and reliable supply of electrical energy is needed to maintain a quality life in Montana and the United States. Reserves of electrical energy are needed. I have studied projections by the National Electric Reliability Council that indicate increasing demand will exceed present generating capacity, or will reduce reserves to a level of unreliability. I believe these projections are reliable and cannot be ignored.

Our company is involved in the construction of waste water treatment plants whose purpose is to eliminate water pollution and assure quality water. Electrical energy is the only practical way of operating these treatment facilities.

Among other projects our company in the past few years has been involved in the construction of sewage treatment plants at Gardiner, Montana, Tower Falls, Canyon and Fishing Bridge in Yellowstone National Park. The projects we have constructed have added 1,081 horsepower to electrical demand. Appended is a list of treatment plants, we have constructed and the horsepower required to operate them. Also appended is a second list of treatment facilities with horsepower needs of 6,170 horsepower that we have bid on in the past few years, or know to have been constructed. This list is brief and is not intended to be a complete listing of all of this type of improvements in the area. It does exemplify what is occuring in the field of sewage and water treatment.

The following is quoted from an article, forecasting construction activity published in the October, 1975 issue of the national trade journal published by the Associated Builders and Contractors, Inc. "In 1976, however, construction of sewer and sewage treatment plants is expected to be the top growth market, according to a survey of the nations main sanitary districts." The construction referred to is not expansive growth, but is required to correct an intolerable condition where raw sewage and industrial wastes are fouling our nations waters.

The program for improving Montana waters has been under way for some time and it is working. I have correspondence from the Montana Department of Health and Environmental Sciences that confirms this, and also indicates the large effort remaining to reach the goal.

The construction and operation of sewage treatment facilities is necessary and desireable. Electrical energy is needed to operate this type of facility. It is only logical that electric energy must be generated to provide power to accomplish the job of maintaining clean water in this country.

Our company has also been involved in the construction of three pumped sprinkler irrigation systems in the lower Yellowstone Valley and Three Forks area, involving a demand of 4,700 horsepower. These projects in which our company has been involved are only a small part of the effort made in the past few years. The December, 1975 issue of the Montana Rural Electric News states that sprinkler irrigation is planned for 89,677 new acres in Montana in 1976-77.

This type of irrigation brings land under cultivation that cannot be flood irrigated, it is a more efficent use of the water resource, and the rate of water application is easier controlled to decrease saline saturation problems. If present predictions are valid, food and fiber will be short world wide and increased agricultural production will be required. Pumped irrigation is a very practical means to increase agricultural yield.

An increase of 1,400 horsepower to the pump capacity of the Buffalo Rapids Irrigation Project, below Terry, Montana is scheduled as Phase One of a planned expansion. I attended a meeting of the Montana Water Development Association where a plan to pump water from Fort Peck Reservoir to the Milk River drainage, to stabilize agricultural yields in the Milk River area was proposed.

The need to treat waste water and the need for irrigation water are real. An adequate and reliable supply of electrical energy is necessary to accomplish the job. The generating facility must comply with laws and regulations. The time frame for accomplishment of the construction of needed new electrical generating capacity is critical.

Volumnes of numbers have been tabulated to substantiate either the need for added generation, or the lack of need for such generation, and have been presented by proponents and opponents as evidence for the strength of their position. It is my contention that an astute individual only need to observe what is occuring in the world around him, and to observe the job to be done, to know that added electrical demand will occur. Units 3 & 4 will be built with private capital. The directors controlling this private capital are willing to commit their companies to the expenditures required to build Units 3 & 4 based on their faith that a market for the energy produced will exist. I propose we let them go, and if their are wrong and cannot sell the energy their companies will suffer in the most direct way.

I request and urge that the necessary construction permits for the construction of Colstrip Units 3 & 4 be issued, and that progress toward their completion be expedited. Thank you for the opportunity of appearing before this board and making my views known.

WATER OR WASTE WATER TREATMENT PLANTS CONSTRUCTED BY COP CONSTRUCTION CO.

Type	Location	Rated Motor Horsepower Installed
Water	Fort Belknap, Montana	120 hp
Waste Water	Lake-Fishing Bridge, Yellowstone Park, Wyo.	350 hp
Waste Water	Gardiner, Montana	120 hp
Waste Water	Tower Falls, Yellowstone Park, Wyoming	14 hp
Waste Water	Canyon, Yellowstone Park, Wyoming	336 hp
Waste Water	Canyon Lift Stations, Yellowstone Park, Wyo.	96 hp
Waste Water	Mammouth, Yellowstone Park, Wyoming	45 hp
		1081 hp

WATER & WASTE WATER TREATMENT FACILITIES UNDER CONSTRUCTION OR RECENTLY BUILT

Type	Location	Rated Motor Horsepower Installed
Wastewater	Glasgow, Montana	75 hp
Water	Chinook, Montana	195 hp
Wastewater	Old Faithful, Yellowstone Park, Wyoming	285 hp
Wastewater	Norris, Yellowstone Park, Wyoming	50 hp
Wastewater	Madison Junction, Yellowstone Park, Wyo.	95 hp
Wastewater	Grant Village, Yellowstone Park, Wyo.	40 hp
Wastewater	Billings, Montana	3500 hp
Water	Billings, Montana	1930 hp
		6170 hp

EXAMINATION OF JOHN L. HANSEN

Cross, by Department of Natural Resources and Conservation,
By Mr. MacIntyre:

Q Mr. Hansen, you're the president of Cop Construction Company?

A That's right.

Q Have you talked with anyone previous to coming to testify here, with the applicants, with respect to the testimony you are giving here today?

A No, sir.

Q Do you have any contracts in regards to Colstrip 1 or 2?

A We have had contracts on Colstrip 1 and 2 in which we worked at Colstrip 1 and 2 and we had previous contracts with Montana Power Company. To my knowledge, all were secured in a competitive bid in which we were the low bidder.

Q Do you plan on making any bids with respect to Colstrip 3 and 4?

A If the opportunity is afforded us, yes.

Q You say your firm is interested in irrigation work. Is it true that the more sprinkler irrigation is put in, the more likely that you will have more contract work to do?

A We bid general construction in all fields. Yes, we would bid any opportunity given us to bid on sprinkler irrigation work or gravity irrigation work, or any works of this nature. This is our business, and we do bid every project if we think we can cover, and sometimes we're successful.

Q So you would like to see more sprinkler irrigation in Montana?

A I would like to see sprinkler irrigation on a basis that I think it is more efficient use of the resource, and, this is an opinion, better than the normal gravity system. We also work on dams and gravity-type work. We are working presently on two soil conservation projects: One at White Sulphur Springs and one at Lewistown in which we are doing the concrete work and this nature, but as far as the spreading of water, this is my opinion, that it's a -- that sprinkler irrigation is a more efficient use of the water resource.

Q You make the statement that an adequate and reliable supply of electric energy is needed to maintain a quality life. Does that quality of life include clean air and clean water?

A Yes.

Q Do you think that conservation methods would be helpful in maintaining an adequate and reliable supply of energy?

A Repeat the question, please?

Q Do you think that conservation methods would be helpful in maintaining an adequate and reliable source of energy?

A Yes. Would you run that past me one more time. I'm a little hard of hearing. Do I think what?

Q Do you think conservation methods would be helpful in maintaining an adequate and reliable source of electrical energy? In Montana?

A I thought we were talking about improving the quality of life. I'm sorry. I don't know that I'm qualified to answer that question as such.

Q You have shown some figures in your statement relative to water and waste water treatment plants.

A Yes, sir.

Q Do you know whether there have been any studies made that would show that municipal sewage plants can be constructed so as to fuel themselves and require no further additional electrical energy?

A In the technical journals that I have read, yes I have seen people make studies on this, and I don't know how practical they are, but I do know that there are studies in which the use of waste, municipal wastes, are proposed to be ground up and used as a source of energy for the city, the plant, and things like this. But I'm no expert on it.

Q Do you not know that there are some plants of that nature in operation in the United States today?

A I'm not aware that there are.

MR. MacINTYRE: I have no further questions.

HEARINGS EXAMINER: Okay. You're excused and your testimony will go to the board. Mr. Ellingsen? Mr. Eddleman?

M.E. EDDLEMAN, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

(THE WRITTEN DIRECT TESTIMONY OF MR. M.E. EDDLEMAN WAS DIRECTED TO BE INSERTED AT THIS POINT.)

Montana Water Development Association

P. O. BOX 162, HELENA, MONTANA 59601

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Worden, MT 59088

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Burlington Northern
Sec. Bank Bldg.
Billings, MT 59101

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Whitehall, MT 59759

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Billings, MT 59103

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JOHN BAUCUS
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JOE CRISAFULLI
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POR DESCHAMPS
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MARK ETCHART
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Dr. SID GROFF
Butte, MT

JOE HELLE
Dillon, MT

VERN KEIL
Conrad, MT

ALLEN KOLSTAD
Chester, MT

ROBERT LEE
Fairfield, MT

GORDON McGOWAN
Highwood, MT

BRUCE MACLAY
Florence, MT

JOHN MORRISON
Helena, MT

EUGENE PHILLIPS
Kalispell, MT

TED WILLIAMS
Bozeman, MT

HAROLD ZENT
Hysham, MT

STATEMENT BY M. E. EDDLEMAN, WORDEN, MONTANA, PRESIDENT, MONTANA WATER DEVELOPMENT ASSOCIATION, BEFORE THE BOARD OF NATURAL RESOURCES AND CONSERVATION

Gentlemen, I am M. E. Eddleman, Worden, Mont., President, Montana Water Development Association and am appearing here today in support of the construction of Units 3 and 4 and related 500 kV transmission lines for Montana Power Company. I make this statement on behalf of the Association's membership. My statement reflects discussions and action of the membership and directors. I operate a cattle ranch north of Pompeys Pillar, Montana. I recently sold a ranch which was irrigated by pumping water from the Yellowstone River. Water was lifted 325 feet by pumps which I had installed to irrigate pastures and hayland. Based on personal experience I am fully aware of the opportunities and benefits from water development - especially as it relates to the use of electrical power to lift water from the river to lands adjacent the river.

The Montana Water Development Association is an organization that has an active interest in water development in Montana. The present organization and the previous two that were combined 9 years ago worked with the State of Montana Water Board and the Bureau of Reclamation as well as private irrigation companies to increase the number of acres using water for irrigation. The membership is varied and the association enjoys the support of farmers, ranchers, municipalities, irrigation districts, rural electric cooperatives businesses and industries in Montana.

The policies of the Montana Water Development Association are reviewed and adopted at each annual meeting. The Board of Directors are specifically charged with carrying out the policies. In line with the policies encouraging water development in Montana and the nation the directors took the following action. Excerpts from the minutes of the MWDA minutes February 26, 1975: "The MWDA present a statement at the Bozeman meeting on Colstrip 3 & 4 favoring the construction of the plants and the transmission lines, and the President of the Association makes the statement. The motion passed unanimously and it was noted that the secretary should show in the minutes that the vote was unanimous. There was no opposition expressed by anyone in the meeting. It was pointed out that agriculture would be at the bottom of the list for additional power in the years ahead. The Bureau of Reclamation stated they had no additional power to supply additional loads after 1977."

At the next meeting March 20, 1975 when the minutes were reviewed by the directors, one director who was not at the Feb. 26, 1975 meeting asked that the minutes of the March 20, 1975 meeting show that as a director of MWDA he does not approve Colstrip 3 & 4 construction. There was no other opposition at this meeting or meetings held since that date.

Our interest in the construction of Colstrip Units 3 and 4 comes primarily from our interest in the production of food and fiber for the nation. Much of this production in Montana will have to come from additional irrigated acres, Later on in our presentation we will document some of the projections that have been given for irrigation of land in Montana and the need to have an adequate supply of electrical energy to pump water from rivers and from deep wells to supply the water for the irrigated production. One of the problems we are faced with in agriculture today is the loss of irrigated acres to housing developments, highways, industry and the growth of cities and towns, The Department of Revenue and State Board of Equalization reports show that the period of time from 1966 through 1974 there were over 20,000 acres of irrigated land lost to food and fiber production in Montana. If agriculture is to meet the challenge, we will have to develop additional acres of irrigated land. To get this accomplished most of these lands that will be irrigated are above gravity flow potential and will require pumping water from river and wells.

There are several of these developments in Montana and new ones are being planned and started each year.

To give an indication of the value of irrigated lands to Montana statistics compiled by the Department of Agriculture show that income has grown from $76,000.000 in 1965 to over $270,000,000 in 1973. Recognizing inflation trends in this period of time we can show that in one year from 1972 to 1973 the increased value was $141,000,000 from irrigated acres. These dollars not only help the farmers and ranchers using irrigation but also the economy of nearby communities. One of the greatest needs today is to increase our tax base. As more lands are developed through irrigation property values will increase and so will the tax base for the betterment of all.

During the recent hearings held throughout the state by the Department of Natural Resource and Conservation a staff member stated that an additional 500,000 acres could be irrigated in the Yellowstone river basin. The Bureau of Reclamation has indicated some 840,000 more acres in Montana could be irrigated. A major portion would require power and energy to get water onto the land. One of the big problems is to determine the most efficient method of applying the water to the land. Development work done thus far by the Extension Service, private industry and agricultural interests indicate that the most efficient way is via sprinkler systems - either the center pivot or other types.

Each type requires varying amounts of power and energy. Electrical power is the most widely used today and appears to be the most economical. The conversion of those dryland acres to irrigation will require a large portion of the output of Units 3 and 4 reserved for use in Montana.

To indicate how fast this takes place the Montana Rural Electric News published figures showing over 1,074,000 acres in Montana presently being irrigated. Their survey indicates that some 112,331 acres of new land will be added under irrigation in the two year period from 1976 to 1977. Some 89,677 acres will be by center pivot or other type of sprinkler irrigation. Additional power for pumping will be required. During the past years according to their figures, there have been 41,489 acres converted from flood irrigation to sprinkler irrigation. Each of these conversions also require pumping power.

The economics of sprinkler irrigation has been documented by LeRoy D. Luft, Extension Farm Management Economist, from Montana State University when he presented a paper on this to the 1975 Extension Annual Conference in Bozeman, Montana. In one example he used the following:

"The expected labor and management return, according to the calculations, show an increase of $102.55 per acre. This amounts to $16,408 for 160 acres put under irrigation."

In another portion of the same report Mr. Luft shows that the expected gross value of crops from dry land farming would be 26 bushels per acre times a price unit of $3.50 equaling $91 for a two year (crop-fallow) showing only $45.50 each year compared to the same land being irrigated giving a return of $102.55 for the production from land that is under irrigation and cropped annually. Mr. Luft recognized that there would be costs involved in putting in sprinkler systems but that the costs could be recovered in a very short time.

The amount of land to be irrigated varies from 500,000 in the Yellowstone River Basin to over 800,000 acres in the State of Montana. Most of the land to be irrigated would be above flood plain level and would require vertical lifts from 100 to over 400 feet. About 30% of Unit 3 or 4 would be required for pumping power when fully developed.

People in agriculture are concerned about the adequacy of electrical power. We believe Colstrip Units 3 and 4 would give us assurance of adequate electrical power and energy to put these acres under irrigation to increase production of food and fiber in the State. Agriculture producers are at the mercy of the market place. They get paid what is offered not what the producer sets as his price he must have for his product. He can not compete for electric power if in short supply on the basis of highest price bid. It boils down to this - there must be an adequate power supply and the way to get it is build Units 3 and 4. Future irrigation alone will require a large portion of that reserved for Montana.

As the demand grows for electricity for irrigation on the farms and ranches in Montana there will be additional needs for more electricity. Electricity has helped agriculture people to replace the loss of labor on farms in the nation. The demand continues to climb for electricity uses on our farms.

We want to thank you for the opportunity for the Montana Water Development Association to appear and testify. We are very much concerned with an adequate supply of electricity for use by the farmers and ranchers in Montana and the Northwest. In this matter we are principally interested in electricity for irrigation, however, as the irrigation load grows so will the use of electricity on the farms of our State.

M. E. Eddleman, President
Montana Water Development Association
Presented February 19, 1976

EXAMINATION OF M.E. EDDLEMAN

Cross, by Department of Natural Resources and Conservation,

By Mr. Doney:

Q Mr. Eddleman, you're the president of the Montana Water Development Association; is that correct?

A Yes, I am.

Q And you're appearing here today in support of units 3 and 4?

A Yes, I am.

Q How was the support of your organization obtained? Was it made just by your board of directors?

A Yes, it was.

Q Was the membership polled in any manner to determine their feelings on Colstrip 3 and 4?

A No, they weren't. To my knowledge.

Q How many members does your organization have?

A We have in the neighborhood of 500.

Q How many are on the board?

A I think there's 24, I think.

Q Is Mr. Keith Williams the secretary-treasurer of your organization?

A Yes, he is.

Q Is he an officer in the Montana Power Company?

A He works for them. I don't know what position.

Q I notice at the bottom of your statement on page 1, Mr. Eddleman, you say, in line with the policies encouraging water development in Montana and the nation, the directors took the following action, and then you quote their statement.

A What was this. Excuse me, I didn't --

Q The bottom paragraph on page 1, Mr. Eddleman. It says the -- in line with the policies encouraging water development, et cetera; how does Colstrip 3 and 4 encourage water development?

A Well, we feel that if the irrigation potential of Montana is to be utilized, that there's a definite need for energy to lift this water to these plains to be irrigated.

Q If the energy were available without Colstrip 3 and 4, would the Montana Water Development Association be in favor of Colstrip 3 and 4?

A Not that I know of. This is our primary objection, I mean objective, is to get energy to produce the power to irrigate these lands.

Q You want energy for irrigation, is that correct?

A That is correct.

Q And you don't really care how it's obtained; is that also true?

A That is correct.

Q Has your board or yourself done any studies on Colstrip 3 and 4?

A I don't understand what you mean about studies.

Q Well, have you read the environmental impact statement, for instance, presented here in this proceeding?

A I haven't read an environmental impact statement.

Q What information did your board use to reach the position statement you're submitting here today? Did they just take a vote?

A Yes, sir.

Q Had they read any studies that had been done on this project?

A We discussed the need for energy to develop these lands.

Q Then I gather the essence of your testimony is that you feel that energy is needed and if Colstrip 3 and 4 fulfills that need, fine; if it doesn't, if the energy is still available, it's still fine; is that true?

A This is true.

MR. DONEY: All right. No further questions.

HEARINGS EXAMINER: Very well,sir, thank you. Mr. Ellinsen?

N.H. ELLINGSEN, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Do you have anything to add to your written statement, sir?

MR. ELLINGSEN: Not at this time.

HEARINGS EXAMINER: It'll be filed and received by the board.

(THE WRITTEN DIRECT TESTIMONY OF MR. N.H. ELLINGSEN WAS DIRECTED TO BE INSERTED AT THIS POINT.)

Yellowstone
ELECTRIC CO.
ELECTRICAL CONTRACTORS

N. H. ELLINGSEN
President
JAMES D. LARSON
Vice President
EDW. G. CESTNIK
Secretary, Treasurer

February 18, 1976

Mr. Carl M. Davis
Hearing Examiner
P. O. Box 187
Dillon, Montana 59725

RE: Colstrip Generator No.'s 3 & 4
Colstrip, Montana

Dear Mr. Davis:

The following constitutes my testimony as a proponent of the above referenced generating plants.

My name is Norman H. Ellingsen. I reside at 844 Burlington Avenue, Billings, Montana. I have been a resident of Montana for 55 of my 62 years. I am president of Yellowstone Electric Co.; a position I have held since 1951.

Yellowstone Electric Co. is one of the major electrical construction firms in Montana. Our company was formed in 1937 and was incorporated in the State of Montana in 1946.

Yellowstone Electric Co. has grown with Montana and has performed in excess of $3,500,000.00 worth of electrical installations in their 1975 fiscal year.

CONTRACTING OFFICE & SUPPLIES
1919 - 4TH AVENUE NORTH / PHONE 406 252-3407 / BOX 2018 / BILLINGS, MONTANA 59103
RETAIL STORE & DISPLAY ROOM
520 NORTH 32ND ST. / PHONE 406-248-7756 / BOX 2018 / BILLINGS, MONTANA 59103

Considering that Yellowstone Electric has been in the electrical business some thirty-eight years and performs a substantial amount of electrical work, we feel that we are qualified to present certain facts relating to the demand for electrical energy in Montana and our trade area.

Construction of all types of facilities, commercial, industrial and residential is very high in this area which accounts for the large demand for electricity. The trend each year for increased electrical energy including electric heat in new and existing facilities, is very obvious, if not astounding. Of course this is brought about by the apparent shortage of petroleum products and natural gas.

A good example of this is Gillette, Wyoming, where the new school and Saint Matthew's Catholic Church were denied natural gas service to their new facilities. The electrical engineer for these two projects estimate their demand for electricity at 240 KW and 200 KW respectively. Another Wyoming facility, the Jackson Golf Club, has changed to electric heat and expanded their facility. This will add 500 KW to their existing 225 KW requirements.

In order to show a small number of the projects that have added substantial demand for additional electric energy, I respectfully submit the following listed projects and their electrical requirements for your information.

NEW FACILITIES ADDING ELECTRICAL LOAD COMPLETED WITHIN THE LAST YEAR

PROJECT	LOCATION	ADDED LOAD
*Security Federal Savings	Billings, Montana	462 KW
METRA(Multi-Use Building)	Billings, Montana	1,898 KW
Sewage Plant	Crow Agency, Montana	200 KW
Career Center School	Billings, Montana	1,600 KW
Boise-Cascade Plant	Laurel, Montana	1,800 KW
*Hennessy's Dept. Store	Billings, Montana	960 KW
Rimrock Mall	Billings, Montana	5,300 KW
Montgomery Ward Store	Billings, Montana	1,200 KW
Sewage Treatment Plant	Yellowstone National Park	178 KW
Trident Cement Plant	Trident, Montana	565 KW
TOTAL	- -	14,163 KW

NOTE: *Indicates ALL ELECTRIC, no natural gas service to building.

NEW FACILITIES TO ADD ELECTRICAL LOAD WITHIN THE NEXT 18 MONTHS

PROJECT	LOCATION	NEW LOAD
*Granite Tower Office Bldg.	Billings, Montana	1,860 KW
*First National Bank Bldg.	Billings, Montana	1,920 KW
Saint Vincent's Hospital	Billings, Montana	1,750 KW
Rimrock Mall	Billings, Montana	3,580 KW
Sewage Treatment Plant	Billings, Montana	8,000 KW
Water Filteration Plant	Billings, Montana	21,000 KW
McCone County Nursing Home	Circle, Montana	1,085 KW
*Community Health Center	Lame Deer, Montana	436 KW

PROJECT	LOCATION	NEW LOAD
Tribal Building	Lame Deer, Montana	133 KW
*High School	Lame Deer, Montana	1,600 KW
*Homestead Lodge	Absarokee, Montana	199 KW
Decker Coal Co. Shop	Decker, Montana	550 KW
Central Montana Hospital	Lewistown, Montana	1,598 KW
TOTAL -		43,711 KW

NOTE: *Indicates ALL ELECTRIC, no natural gas service to building.

The above listed projects were designed by professional engineers and the data submitted is taken from the contract drawings and specifications.

It should be interesting to note that Yellowstone Electric Co. is only one of many large and small electrical contractors in Montana. We have not attempted in any way to list all the small and large projects that have been completed or that will be completed in the near future in Montana.

Further, in the year of 1975, Yellowstone Electric Co. paid for 143,618 hours of productive electricians' labor. This does not include service work and therefore must be counted as installing electrical systems which in all cases add to the electrical load requirements of the serving utility.

There are 407 licensed electrical contractors in the State of Montana. Considering the fact that Yellowstone Electric is only one of these contractors and accrued 143,618 hours of electricians' labor in 1975, it must follow that there is a tremendous amount of electrical work being performed in this state which then most certainly will build electric generating requirements.

Further, if we consider the health of our economy and employment of our people, it is not hard to see that if sufficient electrical energy is not available a substantial percentage of the electricians in the state will not have employment. If electrical energy is not available to industry, this condition could effect the economy of Montana in that there would be less construction which in turn would cause unemployment in the other trades and adversely effect business in all areas.

The above information is offered for your use in determining the critical need for additional electrical generators in this area. I therefore sincerely recommend the construction of Colstrip Units 3 & 4.

Very truly yours,

YELLOWSTONE ELECTRIC CO.

N. H. Ellingsen
President

NHE:jj

EXAMINATION OF N.H. ELLINGSEN

Cross, by Department of Natural Resources and Conservation,
By Mr. MacIntyre:

Q Mr. Ellingsen, does your contracting corporation have any contracts for construction on units 1 and 2?

A We've had a small amount of work.

Q Do you plan to make any bids for 3 and 4?

A If we are asked to. The Bechtel Corporation does all the major electrical work on the site.

Q Do you expect to be?

A Pardon?

Q Do you expect Bechtel to ask you?

A I expect 3 and 4 will be handled in the same manner.

Q Has anyone in your corporation been contacted by anyone of the applicants to give testimony here today?

A We are, by necessity and by choice, very close to the Montana Power Company. Our people, I would say, discuss one thing or another with them practically daily.

Q Did anyone ask you to come here and give testimony?

A Yes, they did.

Q Who was that?

A Chet Belden.

Q And he's with?

A The Montana Power Company.

Q On page 2 of your statement you say construction of all types of facilities, commercial, industrial, and residential is very high in this area, which accounts for a large demand for electricity. This area, what do you mean by that? The

Billings area?

A In the Billings, Montana vicinity, actually the northern Wyoming and areas close to Montana.

Q Does that mean that --

A Presently we are only working within Montana and northern Wyoming.

Q When you say very high, does that mean there are a lot of jobs in this area?

A Yes, there are.

Q How much of that is attributable to 3 and 4?

A Very little, if any. My statement was based on the fact that we know the developments that are going on in Montana, and that Montana, obviously, is growing much faster than anyone would expect at this time.

Q You list on page 3 added loads and new loads. How much of that load is presently committed?

A Well, the first list of 14,163 KW is committed. On the second list, the 43,711 KW will be added; it is not committed, to my knowledge.

Q When will units 3 and 4 be constructed?

A 3 and 4? They're supposed to be on line in 1980.

Q So how much of 3 and 4 will affect these loads that you have listed here?

A 3 and 4 will pick up where the power, present generation power, we feel, is at that point where it's used. As an example, these loads that I show you are only in Billings and immediate vicinities, and only the ones that we are involved with, to that extent. The other thing that you should notice on these lists is that the large projects that have gone totally electric, and this is a trend, and of course, it's based on the fact that there's a shortage of petroleum.

Q Do you know whether or not the Department of Natural Resources' EIS considered these loads? Total block loads?

A No, I don't.

Q Do you also know whether there are any studies which show that municipal sewage plants can be constructed so as to fuel themselves without the needed additional electrical energy?

A I didn't get your question completely.

Q Well, do you know whether or not sewage plants can be constructed and operated and fueled by themselves without the need for electrical energy?

A In some cases, yes.

Q Are there some presently in operation in the United States?

A The only one I know of is a plant in Missoula that uses their garbage as a source of power where they're generating part of their needs for the plant.

Q On page 4 of your statement you say that during the year 1975, you had 143,618 hours of electricians' labor. Is that all new construction, or is some of that renovation?

A In this instance, I would say that 95% of that was new construction.

Q Was all the electricians' labor union labor? Was that all union labor, the electricians' labor?

A Yes, it is.

Q How much of the electrical work that was done last year can be attributable to 3 and 4?

A I think I can give you the dollars.

Q Well, has 3 and 4 been built yet?

A Pardon?

Q Has 3 and 4 been built yet?

A Oh, on 3 and 4? No.

Q Do you know whether or not Montana is a net importer or exporter of electrical energy?

A I have the impression that both occur, the import and export to some extent, not large quantities, based on their generation capacity.

Q Would you be surprised to learn that Montana is a net exporter of electrical energy? Presently?

A Presently I wouldn't be surprised if they are.

MR. MacINTYRE: I have no further questions.

HEARINGS EXAMINER: Thank you,sir. Did you have anything further you wanted to add?

WITNESS: My intent is to show that in the very small area here, the growth that has taken place between one year and the proposed additional year, that I doubt if anyone making a research out of these conditions is aware of. As an example, these projects, some of them are very new, and people don't go around advertising what they're going to build for a commercial or industrial plant until they're ready to go. I see, as an example, in just this small area, in 1976 and part of '77, there'll be three times the amount of electrical power needed than there was in 1975 in the same area. I think that's all I have.

HEARINGS EXAMINER: Very well, than you, sir. Do you have any more re-cross?

MR. MacINTYRE: No further questions.

HEARINGS EXAMINER: Very well, you're excused. Mr. Pile?

ROBERT D. PILE, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: All right. You may cross-examine.

MR. PILE: With your permission, I would prefer to read my prepared statement prior to cross-examination.

MR. SHERIDAN: No, it's just going in the record, sir.

HEARINGS EXAMINER: I don't know whether I had an opportunity to explain it to you, but there's none of us who make any decision here so it just goes to the board members in writing itself, you see. They don't get to hear it so it might as well go to them, so we don't have to transcribe it and redo it, if you don't mind. We'd sure appreciate it.

MR. PILE: Okay.

(THE WRITTEN DIRECT TESTIMONY OF MR. ROBERT D. PILE WAS DIRECTED TO BE INSERTED AT THIS POINT.)

STATEMENT IN SUPPORT OF COLSTRIP 3 & 4

to the Montana Board of Natural Resources

My name is Robert D. Pile. My residence address is 807 North Crow, Hardin, Montana 59034. I have been in the Rural Electric Power business for eight years and am presently, since Nov. 1, 1975, General Manager of the Big Horn County Electric Cooperative with general office located in Lodge Grass, Montana.

Big Horn County Electric Cooperative is a membership cooperative owned by the farmers, ranchers, wage earners, and small businessmen who reside and make their living in the rural areas in most of Big Horn County, Montana and part of Sheridan County, Wyoming.

This statement represents the unified position of the Cooperative's elected Board of Trustees, who authorized and directed me to appear at this hearing in support of issuing a Certificate of Environmental Compatability and Public Need for the Proposed Colstrip Project Units 3 & 4. I, too, strongly support this proponent position.

We serve most of Big Horn County, Montana, most of the Crow Indian Reservation, part of the Northern Cheyenne Reservation, and part of Sheridan County, Wyoming. We provide electricity to approximately 6,000 Montanans that live in and around Crow Agency, Lodge Grass, Wyola, Kirby, St. Xavier, Fort Smith, and the North Valley. In Wyoming we serve approximately 350 Sheridan County residents in the area of Parkman and north of Dayton and Ranchester.

These rural families are highly dependent on electric energy to sustain their standard of living, their way of life and to help meet the requirements of their farms and ranches.

Most of our member-consumers are involved in Agriculture, but we also serve many other vital activities such as oil wells and pipelines, AM, FM, and short-wave radio facilities, telephone exchanges, amplifiers and micro-wave relays, a public health, 34-bed hospital, a 6-chair dental clinic, water purification and pumping sewage disposal, interstate highway lighting, community street lighting, public schools and churches, a mission orphanage, fire station, first-aid centers, food stores, railroad crossing signals, and seven U.S. Post Offices--all of which are essential to our well-being.

Like the great majority of Montanans, we have always depended on the Montana Power Company for all of our wholesale electric power, and they have always filled this need admirably. But -------------------------

We are also dependent on them for all of our rapidly growing future needs. This future growth is our greatest concern for several important reasons:

First, our electric energy needs still continue to increase. Our annual average increase has been 8.5% over the past 20 years. In 1955, an 8.5% average increase meant 540,000 additional kilowatt hours per year. But by 1965 this 8.5% growth had escalated to an average of over 1.5 million additional kilowatt hours per year. In 1975 we purchased 35.3 million kilowatt hours, an increase of 4.8 million kilowatt hours over 1974. By extending the 8.5% growth trend to the year 1985, we can see that our needs from the Montana Power Company will be increasing by 3 to 6 million kilowatt hours per year; and our total requirements in 1985 will be in excess of 79 million KWH. This is over double the 35.3 million we purchased in 1975.

Another reason growth is our big concern is that it's neither feasible, nor possible for us to generate our own electric energy. Generation, as we know it today, requires tremendous amounts of capital and expertise, and to be efficient must be sized far in excess of our needs. We must, therefore, like many other cooperatives look to the Montana Power Company to fulfill this function.

And most importantly, the new electric energy needs of our members are primarily for essentials--not for entertainment nor luxury items. Because of erratic supplies and price increases in propane and fuel oil, more and more people of Big Horn County are turning more and more to electricity for their basic energy needs such as cooking, water heating, and space heating. Big Horn County farmers and ranchers are installing more and more irrigation systems powered by electric energy to convert dryland into irrigated cropland as the best means of multiplying their production and reliability of grain and hay crops. We have provided electric service for 22 additional irrigation systems in the past 5 years and our kilowatt sales in this classification of service has increased 140%. We plan to provide service for more irrigation systems this year. We can't turn these away! And there's more ----------------

Let's look ahead five, ten, twenty years to the Bureau of Reclamation's Hardin Unit irrigation project. This food resource--multiplication project will convert 10,000 acres of cultivated dryland, and 32,600 acres of range and pasture into 42,600 acres of irrigated cropland. With water from the Yellowtail Dam, the Hardin Unit according to Bureau of Reclamation studies, could produce on 2,000 acres a yield equivalent to what is being cropped today on the entire 42,600. The other 40,600 irrigated acres with rotation farming could produce:

25,000 tons of corn silage
40,000 tons of alfalfa
269,000 tons of sugar beets and
668,000 additional bushels of barley.

Bureau of Reclamation data indicates the project will develop its own energy for pumping irrigation water to lands of the Hardin Unit. However, more than 7,000 horsepower, and 8 million kilowatt hours per year will be required for farm families, incidental farm uses, and for those individual farm units that choose to use sprinkler irrigation.

Here's an opportunity to multiply our food resource capability by at least twenty times on these 42,600 acres. Where will we get the electric power for this project when it's needed? To meet our utility responsibility, we must have a dependable, long range supply of electric power that will fulfill the basic electric energy requirements of the rural people of Big Horn County. Montana has abundant coal, why not have abundant electricity?

We are grateful that the Montana Power Company has the foresight to make the long range plans that are required for the financing and construction of their Colstrip steam plants. They are facing their utility responsibility, and we think Colstrip Steam Plants 3 & 4 should be approved by the Montana Board of Natural Resources and Conservation. Thank you.

EXAMINATION OF ROBERT D. PILE

Cross, by Department of Natural Resources and Conservation,
By Mr. Sheridan:

Q Mr. Pile, I understand, basically, I think, what you want to say in your statement. Let me see if my summary is correct. You need energy?

A Yes.

Q Have you told anyone about your needs for energy before today?

A Well, when I say I need energy, any power company in a responsible position does have to plan somewhere in the area of 10 years in advance.

Q Have you been planning for your energy needs for the next 10 years?

A Yes, we have.

Q Have you been informing the power company of your needs for energy all along?

A Well, as I've indicated in my statement, I'm fairly new in the area here in Montana, and I have not personally discussed our energy needs with the Montana Power Company. I certainly will.

Q You don't know, then, whether your Big Horn County Electric Cooperative has ever informed the Montana Power Company of its needs for electricity?

A I feel most definitely that they have.

Q And I assume that the needs that you say you have for energy, which are set forth in your statement, have been made available, or communicated to, the power company; right?

A Right.

Q And you've been doing that all along, right?

A Right.

Q So this is really nothing new that's happened in the last week or two, really?

A No. Definitely not.

Q If power were available to you from Colstrip units 1 and 2, and you didn't have a need for additional power, would you still support units 3 and 4?

A Yes, I believe we would.

Q Wouldn't that create excess capacity?

A Well, I'm not sure what the point of excess capacity --

Q Well, how do you pay for a power plant, sir?

A Through your revenue sales of electricity.

Q That's the consumer, right?

A Right.

Q If you don't sell all that power, you have unused capacity, don't you?

A Right.

Q And that means your rates are higher because you've got to pay your bills, right?

A Well, on the other hand, you can't build a small power plant right today and build a new power plant every year for your increased capacity. It would be cheaper to go ahead and have some excess capacity.

Q You have to do it on your best forecast, don't you?

A Right.

Q And if your forecasts show that you don't need that power, you don't have any business building the facilities, do you?

A Well, that's a matter of opinion.

Q Well, you don't build it not to use it, do you?

A Well, there definitely will be a use on it, based on past experience and growth rates.

Q Do you know how many percent of the power to be generated from Colstrip units 3 and 4 is going to be exported?

A No, I do not.

Q Would 70% surprise you?

A Well, since I'm not aware of the figures, I would be surprised.

Q Have you ever been to Colstrip?

A Yes, I have.

Q Have you ever talked to any of the people that live around Colstrip?

A No, not other than some of the personnel that --

Q Have you read the environmental analysis put out by the applicants?

A No.

Q Have you read the environmental impact statement draft and the final put out by the Department of Natural Resources?

A No.

Q Have you attended any of the hearings to date?

A No, sir.

Q Are you aware of the various forms of pollutants which will be emanated from the coal-fired generating facilities as proposed?

A No.

Q Do you know what the dangers to the human respiratory tract are as a result of inhalation of SO_2?

A No.

Q NO_x?

A I have seen the plant and I have seen very, very little pollution.

Q Well, do you know whether SO_2 is visible?

A No.

Q Do you know whether hydrogen fluoride is visible?

A No.

Q Do you know whether NO_x is visible?

A No.

Q Have you ever made any studies to find out the effects of SO_2, O_3, NO_x, or hydrogen fluoride on the human respiratory tract?

A No.

Q Have you ever seen the effects of hydrogen fluoride accumulations in forage that has been ingested by cattle?

A No.

Q Have you ever lived in the vicinity of a coal-fired generating plant?

A No.

Q Do you know what the meteorology is in the area of Colstrip?

A No.

Q Do you have any idea of the risks to which the residents of the Colstrip area and Rosebud County are being subjected if these plants go in?

A No.

Q Do you know how much water is being consumed per minute by the operation of the scrubbers, or by the operation of the plant itself at Colstrip as proposed?

A No.

Q Do you know how dependent the residents in the vicinity of the Colstrip power plant facility or Rosebud County are upon ground water?

A No.

Q Are you aware of any soil permeability studies at Colstrip to determine whether or not leakage from the ash ponds, the sludge ponds, or any cooling ponds, will affect ground water?

A No.

MR. SHERIDAN: I have nothing further.

HEARINGS EXAMINER: Thank you very much. Your statement will go to the board, because they won't get to hear it, see, and they make the decision, so it'll go and they'll be able to read it, and we'll read it. You're excused. Mr. Boyd?

J.P. BOYD, appearing as a public witness, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Your statement, too, will go to the board members to read, sir. Thank you; you may cross-examine.

(THE WRITTEN DIRECT TESTIMONY OF MR. J.P. BOYD WAS DIRECTED TO BE INSERTED AT THIS POINT.)

STATEMENT IN SUPPORT OF COLSTRIP 3 & 4

to the Montana Board of Natural Resources

My name is J. P. Boyd, also known as Sonny Boyd. I live on a Cattle Ranch 27 miles southwest of Lodge Grass, Montana on the Crow Indian Reservation.

I am Secretary-Treasurer of the Big Horn County Electric Cooperative, and as such, I whole-heartedly endorse the construction of Colstrip Three and Four. Although the Manager--Mr. Robert Pile--of Big Horn County Electric Cooperative is here to testify for the Management of the Cooperative, I am here to speak for myself and some of my neighbors who are very much aware of the necessity for abundant, reasonably priced electric power to properly operate their businesses in order that this Nation may continue to enjoy adequate food and fiber.

In the first place, in order for us to enjoy "reasonably priced" electric power, I urge the immediate construction of Colstrip Three and Four. Because, it seems to this old cowboy that with this constant inflation we are--and have been--subjected to, that the more water goes under the bridge, the more construction costs will be; and of course, the consumer always gets stuck with the bill in the final analysis. We cannot operate with a prohibitive electric bill.

Now, as to abundant electric power, my crystal ball leaves a lot to be desired, but my hind-sight is real healthy. I have come from the coal oil lamp to the coal fired electric light; and I know that the demand for electric power in our business has doubled every eight years since we first built REA lines in our area. I see no reason for the future demand to vary from this norm.

I have visited Colstrip numerous times through the years; and on a very recent visit, while Unit One was operating, I was amazed at the lack of visible and audible pollution. I also observed Montana State University grazing cattle on test areas on the reclaimed spoil banks. It seems to me that any rancher would be proud to have that abundant feed growing on his ranch.

So--under the present reclamation procedures, and pollution controls, I urgently advocate the construction of Colstrip Three and Four. It is a must that they be built, or some other source of energy be developed immediately. And so far, no one has shown me a concrete plan for another source.

Respectfully submitted,

J. P. Boyd

EXAMINATION OF J.P. BOYD

Cross, by Department of Natural Resources and Conservation,
By Mr. Sheridan:

Q Mr. Boyd, you're from the same outfit that Mr. Pile is from?

A I'm a director on the Big Horn County Rural Electric, yes.

Q What kind of a study did you undertake, sir, to determine the potential adverse effects upon the citizens of Colstrip and in Rosebud County, if Colstrip units 3 and 4 are constructed?

A I myself, personally, am here to speak personally, and not for the cooperative, as mentioned here, and as far as being a scientist and making studies, I note in here that I'm an old cowboy, and I have been to Colstrip while unit 1 was in operation, and as I note here, I was amazed at the lack of audible and visual pollution, and I don't know a darn thing about chemistry.

Q Do you know anything about what rate the unit 1 was operating at at the time you were there?

A I'm not an electrician.

Q Do you know whether it was even burning coal?

A Yeah, I saw it going in there.

Q When were you there?

A I beg your pardon?

Q When were you there?

A About a week ago, I think.

Q Okay. Have you ever lived around a coal-fired plant?

A No.

Q Have you ever tried, as an old cowboy, to raise cattle around one?

A Well, never having lived around one, I certainly didn't work around one.

Q Would it surprise you to know that some of the pollutants are invisible?

A Oh, heavens no.

Q They can bite you, too, right?

A I beg your pardon?

Q They can bite you, too, can't they?

A They can bite an old cow, too.

Q Right. Have you ever seen cows affected by hydrogen fluoride?

A I really don't know. I've seen cattle that the veterinarians claim to have been.

Q Where is that?

A At the pictures at the state college in Bozeman.

Q You're familiar with the exostatic lesions that form on cattle as a result of ingestion of hydrogen fluoride, then?

A I'm not any veterinarian, no.

Q Okay. You make comment about the reclaimed soil banks in Colstrip?

A Yes.

Q You saw those, didn't you?

A Indeed.

Q And when you reclaim soil, it takes more than a few months, doesn't it?

A I would think so because plants have got to grow.

Q So you don't know then, really, how well the cover grass, or crops, around Colstrip will thrive on a reclamation project occurring during operation of the plant, do you?

A Well, there's only been one plant fired, and very recently.

Q Right. So you don't know, and you really can't say how successful that reclamation will be, because none of the plants, none of the grass over there, has been subjected to pollutants from that plant during the time when that grass must grow; isn't that true?

A Well, of course not. The plant was just recently fired.

Q Right.

MR. SHERIDAN: I don't have anything further. Thank you.

HEARINGS EXAMINER: Thank you very much, sir, and your testimony will go to the board. You're excused. We'll take a brief recess now. Now, Mr. McDevitt, can we get through with him Mr. Peterson?

MR. PETERSON: I won't be ready for him until tomorrow.

(RECESSED AT 3:25 P.M.)

The hearing was reconvened at 3:35 P.M., following a brief recess.

HEARINGS EXAMINER: Let's proceed, gentlemen.

Dr. Devitt?

TIMOTHY W. DEVITT, called as a witness by the Department of Natural Resources and Conservation, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

(THE WRITTEN DIRECT TESTIMONY OF TIMOTHY W. DEVITT
WAS DIRECTED TO BE INSERTED AT THIS POINT.)

STATEMENT OF TESTIMONY

OF

TIMOTHY W. DEVITT

My name is Timothy W. Devitt. I have a Bachelor of Science in Chemical Engineering from the University of California, Berkeley, and have completed the course work requirements for a Master of Science in Environmental Engineering from the University of Cincinnati. I have worked as a Chemical Process Engineer for Stauffer Chemical Company in Richmond, California. My responsibilities were in the areas of process improvement and plant operation for the sulfuric acid, titanium trichloride, and ferric and aluminum sulfate production facilities. Following employment with Stauffer, I joined the predecessor organization to the U.S.Environmental Protection Agency. With EPA, I was responsible for studies in air pollution control. These were primarily contractor conducted research and development studies in which I established the scope of work, reviewed work progress, and evaluated the technical adequacy of the research results. Projects under my direction included:

- Development of models to describe the performance of electrostatic precipitators for particulate emission air pollution control.
- Evaluation of the effect of limestone injection for SO_2 control on particulate emission control efficiencies.
- Systems study for particulate emission control.

Following my employment with the U.S. Environmental

Protection Agency, I joined PEDCo-Environmental Specialists, Inc., a Cincinnati-based consulting firm providing environmental science and engineering services to industry and government. PEDCo-Environmental is one of the PEDCo companies, a group of approximately 500 professionals and supporting staff which provides engineering, architectural, construction management, environmental engineering, energy resource and technical feasibility evaluation services.

Since joining PEDCo I have held the positions of Project Engineer, Project Manager, Project Director, and Vice President, my present position. Studies that I have either conducted or have been conducted under my direction include the following areas:

° Status of flue gas desulfurization technology.

° Costs of flue gas desulfurization systems.

° Analysis of alternative systems for attaining and maintaining SO_2 ambient air quality standards.

° Evaluation of the feasibility of controlling selected plants with particulate and SO_2 emission control systems.

° Evaluation of the feasibility of converting gas and oil-fired boilers to coal-firing.

Recently, I have served as consultant to EPA on the joint EPA/Edison Electric Institute Task Force evaluating the costs and status of flue gas desulfurization technology and as a Delegate for the United States to the Economic Commission for Europe (United Nations) Study Group on the Status of

Desulfurization Technology; provided expert testimony before the National Academy of Engineering (NAE) and the National Academy of Science (NAS) on flue gas desulfurization technology; and evaluated for EPA portions of the NAE/NAS report on the Status of Sulfur Dioxide Control Techniques for Stationary Emission Sources. Over the past several years, I have also conducted and/or supervised a number of studies related to the efficiency, costs and reliability of flue gas desulfurization systems for both governmental and industrial clients.

As a result of these activities, I have concluded that flue gas desulfurization (FGD) is a viable and can be a cost-effective method for controlling sulfur dioxide emissions.

As of January, 1976, the following flue gas desulfurization systems were either operational or under construction in the United States: limestone, lime, activated carbon, double alkali, Wellman-Lord/Allied Chemical, Chiyoda Thorobred 101, sodium carbonate and magnesium oxide. In addition, there are several other systems in the pilot plant stage.

As shown in Table 1, as of January, 1976, there were 22 operational FGD systems on utility-size boilers, 20 units under construction, and 67 units planned. The planned units include those for which there has been a contract awarded, a letter of intent signed or the utility is presently requesting or evaluating bids.

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Table 1. NUMBER AND TOTAL MW OF FGD SYSTEMS

Status	No. of Units	MW
Operational	22	3,828
Under Construction	20	7,026
Planned		
Contract Awarded	10	3,761
Letter of Intent	10	3,911
Requesting/Evaluating Bids	7	3,837
Considering Only FGD Systems	40	19,797
Total	109	42,160

By late 1976, approximately 9,000 MW of FGD capacity will be installed, of which 65 percent will be retrofit applications and 35 percent will be installed on new power plants. By 1980, approximately 40,000 MW of FGD capacity will be installed, of which 30 and 70 percent will be retrofit and new installations, respectively.

Sulfur dioxide efficiencies for the operating units range from approximately 70 to over 90 percent and particulate removal efficiencies are generally above 99 percent for those units designed for particulate removal. Sulfur dioxide removal efficiencies well in excess of 90 percent have been attained on large-scale test units, thereby demonstrating the technical feasibility of such emission control levels.

The FGD system installation size varies from about 30 MW to over 800 MW. The FGD systems have been applied to both low- (0.4 to 1.0 percent) and high- (6.0 percent) sulfur coals. The non-regenerable systems have used a variety of methods for sludge disposal including ponding, dewatering by vacuum filtration and landfilling, and chemical stabilization followed by landfilling to reduce potential environmental impacts to a minimum. The regenerable systems have been limited to date to recovering sulfuric acid, although sulfur recovery units are being installed.

For the past two years, PEDCo-Environmental has been monitoring on a monthly basis the availability of FGD systems. The reliability has improved over the past two years as both the number of units and the operating experience has increased. Complete histories on the availability of operating units, plus other relevant FGD system statistics are presented in the PEDCo bimonthly status report, "Summary Report--Flue Gas Desulfurization Systems," Exhibit 140.

From the material ultimately submitted to me by the applicants, it is my understanding that the emission control system proposed for the Colstrip Power Plant Units 3 and 4 has a guaranteed average SO_2 control efficiency of approximately 40 percent. FGD systems can be designed and operated at considerably higher control efficiencies. Therefore, the SO_2 emission rate from the Colstrip plant will not be reduced to a minimum value and thus the proposed system does not result in the minimum adverse environmental impact. Given the present state of the art, it is possible to design a system to remove at least 90 percent of the SO_2 emissions entering the stacks, and operate such a system at an availability of at least 90 percent.

MR. SHERIDAN: At this time, the Department of Natural Resources will offer for cross-examination Timothy W. Devitt and offer Exhibit 140.

HEARINGS EXAMINER: Very well, Mr. Peterson, cross-examination.

EXAMINATION OF TIMOTHY W. DEVITT

Cross, by Applicants

By Mr. Peterson:

Q Mr. Devitt, your home is in Cincinnati?

A Yes, it is.

Q And you have resided there for how long, sir?

A Approximately eight years.

Q You hold a Bachelor of Science in Chemical Engineering from the University of California, is that correct?

A Yes, I do.

Q Have you ever engaged in the design of any air pollution abatement equipment for coal-fired power plants?

A Not in the detailed design of air pollution control equipment. We are, however, right now, in the process of putting together data books for flue gas desulfurization systems. These data books will identify a typical design and operating parameters. The purpose is to be used for information exchange to assist utilities in their design, architects and engineers, in the design of effective flue gas desulfurization systems. This project is being conducted for the U. S. Environmental Protection Agency in cooperation with some of the utility industry.

Q Is PEDCO Company, for whom you work, a consultant to the EPA?

A Yes, it is.

Q And how long has it been a consultant for EPA?

A Approximately five years.

Q Is that basically in the field of gathering data with regard to flue gas desulfurization systems?

A No, that's one of the areas. We also do environmental monitoring work. For example, we ran the Great Plains Study. We also ran several smelter projects, obtaining information on the ambient air quality impacts of smelters, so we actually are a diversified company in environmental engineering and environmental science.

Q And as far as your work with PEDCO is concerned, is it restricted to one area?

A It's primarily in the area of control of emissions from power plants, but is not restricted solely to that one area.

Q Are there any studies underway by PEDCO, or have there been any studies completed with regard to the analysis of ambient air quality standards of various flue gas systems?

A I don't understand the question.

Q Has your company done any analysis on various flue gas desulfurization systems and their effect on ambient air quality standards?

A Well, we recently completed a report called for under the Energy Supply and Environmental Conservation Act, in which we looked at the impact of various techniques for attaining and maintaining SO_2 ambient air quality standards, and one of the technologies investigated was the use of flue gas desulfurization.

Q And was the use of that technique approved in the report?

A Well, what we did is that we identified the advantages and disadvantages of each technology studied.

Q What were the advantages of the flue gas desulfurization technique?

A Well, the advantages were that it permitted a high level of SO_2 control. It can range in excess of 90% and the system can operate reliably on coal-fired power plants with availabilities in excess of 90%.

Q Well, does that have anything to do with the ambient air quality standards?

A It can. It depends on how the emission standards were calculated in order to determine what reductions were necessary to meet the ambient air quality standards.

Q Do you relate the two standards as being compatible?

A Well, that depends on how the two standards were developed. That gets back into the area of modeling and monitoring, and of course, that, again, goes back to the emission standards necessary to meet the air quality standards.

Q Do you feel that a plant that has satisfied the requirements of the New Source Performance Standards as far as emissions are concerned would, in effect, therefore, meet the ambient air quality standards?

A No, not in all cases, not under all conditions.

Q In some cases?

A It may.

Q Your statement was prepared by yourself?

A Yes, it was.

Q When did you undertake the preparation of this statement?

A I prepared the statement in late January.

Q Who had engaged your services, Mr. Devitt?

A Mr. Shenker.

Q Are those services personal for Mr. Shenker, or has the company been engaged?

A PEDCO-Environmental has been engaged.

Q And was there a contract entered into with PEDCO and Mr. Shenker?

A I really don't know. That was handled by the business group, not the technical group.

Q Does PEDCO charge a normal consulting fee for this type of testimony?

A Yes, we do.

Q What is that?

A It's approximately $300.00 a day.

Q For any individual who testifies?

A Well, it depends. You know, we're really not in the business of testifying at court cases. We're in the business of environmental science and environmental engineering. We happen to have done a lot of studies in the area of the status of flue gas desulfurization technology, and we were contacted by Mr. Shenker and asked if we would enter into a study of this nature, and we said that time permitting, schedules permitting, that we would.

Q And did the study relate specifically to the Colstrip 3 and 4 units?

A It did not relate to the Colstrip 3 and 4 units at all. What we were asked to do was to describe in general, the status of flue gas desulfurization, the overall levels of control that were possible, the types of systems that are available, the reliability with which such systems can operate.

Q In the progress of your study, did you have the availability to you of the Montana Utility Siting Act, which is now known as the Major Facility Siting Act?

A We may have had it available, but I didn't review it.

Q Have you ever been to Colstrip?

A No, I haven't.

Q Is it fair to say, Mr. Devitt, that in the selection of a flue gas desulfurization system, that each case is pretty much site-specific?

A Yes, it is.

Q What do you mean by that?

A First, you have to know the level of control that's required. This, then, enables you to choose between several processes, and the process you select will be conditioned on such factors as the market for recovered byproduct materials, such as sulfur or sulfuric acid. The flue gas flow rate from the boilers is a function of the megawatt capacity, because many of the processes are very cost-sensitive to the flow rate; the overall sulfur content of the coal being provided; the general site conditions, such as available space, available water supplies.

Q Why is the sulfur content of the coal important in the selection or design of the air pollution control equipment?

A Well, for example, with a regenerable process, there are essentially two parts of the process. First is the absorption section, where you remove the sulfur dioxide and put it into the scrubbing liquor; the second part of the system is the regeneration section, and the regeneration system is highly dependent upon the amount of sulfur that is in the scrubbing liquor.

Q Are there any other characteristics of the particular coal which are important as far as design criteria is concerned?

A Well, it depends upon the type of system that you're looking at. Of course, you'd want to look at the alkalinity of the fly ash.

Q How many systems have you reviewed which use the alkalinity of the fly ash as part of the SO_2 absorption system?

A There are very few. Most systems are designed for much higher SO_2 removal efficiencies than can be obtained by using only the alkalinity of the fly ash.

Q What if the fly ash is used with an additional alkali?

A Then you can attain higher SO_2 removal efficiency.

Q Does it depend on liquid to gas ratio?

A Certainly.

Q With regard to the site, the specific site, is it important whether or not the system is operated open or closed loop?

A Well, the ability to use an open loop depends upon site conditions, yes. Open loop, closed loop, that's important for two things; one, for potential complications on process chemistry by use of recycled liquor from the pond to achieve a closed loop system, and number two, if you operate open loop and you don't have a sufficiently high evaporation rate, this is a potential for overflowing into receiving water bodies and thereby creating a water pollution problem.

Q With regard to a closed loop system and the process chemistry, would that, in and of itself, affect the reliability of the system?

A It could. Again, it's very dependent upon system design, the amount of sulfur to be removed or SO_2 to be removed from the flue gases. There are, however, systems operating with very high sulfur contents that are operating on a closed loop system and that are operating reliably.

Q One of the problems that you try to avoid with regard to a closed loop system is that of scaling, is it not?

A Yes, it is.

Q Have you made any study of the chemistry that is involved in the proposed plant at Colstrip?

A No, we haven't. Again, our overall assignment, if you wish to call it --

Q Yes, I understand your assignment. The question was yes or no

A No, we have not. That was beyond the scope of our endeavors.

Q On page 3 of your statement you list the number of flue gas desulfurization systems which are either operational or under construction in the United States. You admit that by far the most prominent flue desulfurization systems are those dealing with limestone or lime?

A Yes, that is correct.

Q Actually, a system such as sodium carbonate is restricted, is it not, basically, to one generating station at Reid Gardiner, Nevada?

A Yes, it is.

Q And that is because of the specific area having the availability of that particular reagent?

A That's one of the factors. You know, there are a whole host of processes and different process developers offer different processes. Certainly, one factor is the availability of the raw material in process selection. I'm not sure that is the only factor -- I'm positive it wasn't the only factor that led to the installation of the CEA system at Reid Gardiner.

Q How many systems have you studied which use the alkalinity nature of the fly ash as part of the SO_2 absorption system?

A Well, again, there are only very few systems, because they just don't remove enough of the SO_2 from the flue gas, and those systems are designed for roughly 85 to 90% of SO_2 removal efficiency, and very few systems have adequate alkalinity in the fly ash to permit this sort of removal efficiency.

Q Which systems have you studied which use a fly ash, the alkalinity of fly ash to remove SO_2?

A The Vailmont system of the Public Service Commission of Colorado.

Q Where?

A Public Service of Colorado.

Q And what's the name of the plant?

A Let me check on that -- I'm pretty sure it's Vailmont. Yes, it is.

Q What page are you on in your Exhibit No. 140?

A Okay, I'm moving back now to -- there are 109 systems in this report -- I'm on page 109.

Q Who is the designer of that system?

A That system is a UOP scrubbing system. It's Universal Oil Products, now referred to as UOP.

Q Is it a turbulent contact absorber?

A It's a TCA unit, yes.

Q And it uses, also, the limestone?

A Yes. It was essentially designed for particulate removal at that station, and then they found they were getting approximately, 40 to 45% SO_2 removal. They then supplemented the system with limestone and obtained efficiencies of approximately 85%.

Q What are they doing on particulate removal, about 95%?

A I really don't have that information in front of me. I wouldn't want to hazard a guess.

Q It's on the next page, background information. Particulate removal efficiency was measured to be 95%.

A But it's preceded, I believe, in that case, by an electrostatic precipitator, so the overall particulate efficiency is higher.

Q How much higher?

A I don't know.

Q Any other systems that you studied that use the alkalinity nature of the fly ash?

A That's about it. We have, however, obtained information on the Shawnee test runs.

Q Shawnee No. 10?

A Yes, the Tennessee Valley Shawnee Station.

Q That's just a test plant?

A That is.

Q Is the Belmont station in operation?

A No. They consider this to be more of a test facility than a full-scale operating unit. The unit is now inactive due to a boiler overhaul.

Q It's not used for commercial use at all?

A How do you define commercial use?

Q Pardon me?

A How do you define commercial use?

Q Is it used for commercial use on the Public Service Commission of Colorado?

A Yes, it is, but they're rather touchy about this situation. They prefer to think of this as a particulate scrubber which has incidental SO_2 removal efficiency. It was designed for particulate removal. They really don't consider it to be adequate for SO_2 removal, and they've done a number of test runs, using limestone and what have you, to try to increase SO_2 removal rates, but they maintain this is more in the vein of experimentation, and thus they wouldn't want to consider it a commercial unit.

Q Well, once again, you have to look at each particular operation and installation in order to determine whether or not that installation constitutes the best technology for that particular facility?

A Yes, certainly.

Q With regard to the statement that you make on page 5, at line 17 -- at line 19, excuse me -- you state that the guaranteed

SO_2 efficiency of approximately 40% is what the Colstrip plants are designed for?

A Yes.

Q How did you obtain that information?

A Well, I served as a consultant to the Environmental Protection Agency and the Edison Electric Institute on the Clean Air Co-Ordinating Task Force, and as part of that activity, survey forms were sent to the various utilities, and PEDCO and Edison Electric Institute then evaluated them. One of the survey forms returned was by the Montana Power Company.

Q And they told you in that guaranty, that with the guaranty on units 1 and 2, I believe, it was one pound of sulfur per million Btu, is that correct?

A They said guaranteed SO_2 removal efficiency would be approximately 40% for average coal.

Q And what did they say below, relative to the guaranty, and the way it was phrased in the guaranty?

A They said it was guaranteed for one pound of SO_2 per million Btu input; based on power plant observations, emissions could be as low as.6 pounds of SO_2 per million Btu. Later on, they also stated, on page 6 of that survey form, top line, SO_2 scrubber facilities, SO_2 40 plus percent removal -- scrubber also removes fly ash.

Q Does that indicate to you that the plant itself is going to operate at that level?

A No, that tells me the system was guaranteed to remove approximately 40% of the SO_2.

Q By the vendor?

A It doesn't say it was guaranteed by the vendor.

Q Who would guarantee it?

A I really don't know the contractual relationships in this case between -- I believe it's Bechtel, the prime contractor, and CEA -- I don't know what the liabilities would be.

Q I don't know what the liability is, either, Mr. Devitt, but my question is, who gave the guaranty?

A I don't know, because it was not specified in the survey.

Q Well, do you think that the company, Montana Power Company, would give the guaranty?

A No, but Bechtel might, or CEA might.

Q Yes, whoever supplied the unit?

A I think that's a touchy issue. It has been in the past, on electrostatic precipitators.

Q Let's assume for the purposes of this discussion that it's either Bechtel or CEA, without getting into the refinements of who may be responsible. The guaranty was written by and accepted by Montana Power with CEA or Bechtel, whichever, and that guaranty was that there would be an SO_2 removal of one pound per million Btu, is that right?

A It sounds a reasonable assumption.

Q You don't know?

A You said, let us assume that Bechtel or CEA entered into a contract to guarantee removal of approximately 40% -- excuse me, a one pound emission regulation. I said that sounds like a reasonable assumption.

Q So as far as you know, the only information that you have is what you got on the questionnaire?

A No, there was a little more, also. I briefly reviewed Mr. Abrams's testimony, and it appeared to me that he was talking about an approximately 40% removal efficiency.

Q What testimony was that?

A Well, it was the testimony he provided in the hearings here in Helena.

Q Was this his deposition testimony, or was that testimony given by Mr. Abrams in this proceeding?

A I'm reasonably sure it was not in the deposition. That was testimony provided by Mr. Abrams in this proceeding.

Q Do you have a copy of that transcript with you here today?

A No, but I think it was Volume 14, 15, 16, somewhere around in there.

Q It would be around 15 or 16?

A Yes.

Q Was the only part of the deposition testimony you've given relative to Mr. Abrams's testimony on 40% removal?

A No, not at all. I was sent the testimony of Mr. Abrams, a rather voluminous amount of paper, and I believe it was the entire testimony of Mr. Abrams, and I just briefly reviewed that testimony. I did not study it in depth.

Q When you make the statement that the emission control system proposed for the Colstrip power plants 3 and 4 had a guaranteed average, are you basing that statement on what you learned from the questionnaire relative to Colstrip units 1 and 2?

A Yes, that, plus the information from Mr. Abrams's testimony, plus using the .77% sulfur coal and meeting the one pound per million Btu regulation that requires approximately 40%, so from all three of those pieces of information, I inferred that it was a 40% removable efficiency system.

Q In other instances, in your report dealing with companies which have installations under contract, whereby you report the expected removal efficiency, do you take time to examine the vendor's guaranty in those contracts to determine whether or not the efficiencies are based upon operation or a written guaranty?

A It depends upon the status of the system. We have inspected a number of facilities and there we attempt to get both the design efficiency and the operating efficiencies. For systems that are obviously just in the design or construction phase, we use the design efficiency numbers.

Q Are there any guaranties of reliability on the system for Colstrip 1 to 4?

A Well, on systems 1 and 2, if you're referring to the questionnaire of the Montana Power Company of March 14, 1975, it says that they anticipate 90 plus percent availability of that system.

Q Do you know whether that's based upon expected operation or guaranty?

A I do not know.

Q Do you have the original there, or is that a copy?

A That's a copy.

Q May I see it?

A Certainly.

MR. PETERSON: May the record show that counsel was consulting with the witness during the course of the examination. I would assume it was as to whether or not the plane was on time.

MR. SHERIDAN: No, that's not the question. You made the wrong assumption, which hasn't been unusual, Mr. Peterson. I asked the witness whether he had another copy, because I intend to mark that as an exhibit.

MR. PETERSON: I don't think it's unusual, either, counsel. I was just calling attention to the fact, as you do with me, so --

Q In your Exhibit No. 140, there are various details which relate to whether or not a particular plant flue gas system is in operation, under construction, planned by contract, planned with letter of intent, or planned with evaluation of bids, and so forth, and I noticed in going through that exhibit, for example, just above -- well, for example, on the Texas utilities that are running a couple of plants down in Martin Lakes, which you note here as their 103 and 104 as the identification number, and those contracts are awarded. Do you know, as a matter of practice, do you inquire of the vendor or the utility as to the provisions of the contract relative to guaranties for removal?

A No, we do not.

Q Does your information, then, rely upon the vendor or the utility to get the information?

A It usually comes from the utility, although in some cases, we also get information from vendors, but in all cases, we try to verify any such information from the utility before it's published.

Q Is there a guaranty with regard to Research-Cottrell on those two systems that you know of?

A There probably is, but I don't know what it is.

Q That information doesn't come to you, is that it?

A We usually have information on removal efficiencies from operating units and some units under construction, but we do not have information on all units under construction or in the planning stages.

Q You don't put that information in as a matter of record keeping or as a matter of reporting?

A We probably have that information back in the office, because we have a more detailed survey form that we keep there, and we extract from that survey form information to be published on a bi-monthly basis.

Q Have you had an occasion to examine any contract which is in existence between vendors and utilities for the installation, construction, or operation of flue gas desulfurization systems?

A Well, we had a chance to look at the famous AEP bid specs on scrubbers a few years ago.

Q How is the famous language stated in that famous contract?

A I can't tell you the famous language.

Q Was it in terms of percentage or in terms of pounds per million removal?

A I believe it was in terms of pounds per million Btu removal, but the interesting thing about that contract were the penalties associated with failure of the scrubbing system to work.

Q And is the guaranty, as such, in terms of pounds removal more or less equated to the federal standard?

A No, in that case -- well, I do not know, but it would probably be related to either the federal standard or the state standard, whichever was applicable.

Q In the event that the flue gas system at Colstrip removes in excess of 70% of SO_2 as an efficiency of removal, based upon an inlet of 1% sulfur to the scrubber, does that represent the minimum adverse environmental impact for that particular system and site?

A No, it does not.

Q Why not?

A Systems can be designed to remove much higher percentages of SO_2 than 70% on 1% sulfur coal. For example, you can look at the Cholla installation of the Arizona Public Service, where they're removing approximately 92% of the SO_2 in the first module, module 1, and the current sulfur content there, I believe, is -- let me look -- there it ranges from .44 to 1%. In addition, there are units such as the horizontal scrubber module that was at the Mohave station of Southern California Edison, which removed up to 98% of the SO_2 from coals which had a sulfur content of less than 1%.

Q And are both of those systems operated closed loop?

A No.

Q As a matter of fact, the Cholla system is operated open loop, is it not?

A The Cholla system is operated with no return liquor from the scrubbing pond.

Q Does that have an effect upon the reliability of the scrubber system?

A It could, but in this case --

Q The Cholla case?

A No, the low sulfur coal case, which pertains to both Cholla and Colstrip -- we're rather fortunate, because the complications in system chemistry are much, much less when you have a low sulfur coal and indeed, it's been shown that systems can operate closed loop on very high sulfur coals and not have problems of process chemistry.

Q And what system is that?

A Well, you have the Paddy's Run system, for example.

Q And that's a small system?

A The flue gas flow rate there was roughly equivalent to 100 megawatts. There's also the LaCygne station, of Kansas City Power and Light.

Q And that runs approximately 70%?

A Approximately, yes.

Q And I assume, then, that in your testimony the closed loop aspect of a system is not important when you're dealing with 1% sulfur coal as far as the chemistry of the system is concerned?

A I didn't say it wasn't important. I said that the potential problems have been solved on systems where that potential problem was much more severe than it is on a 1% sulfur coal.

Q Does disposal have anything to do with it, sludge disposal, as part of the design factor?

A You're no longer talking about open loop as versus closed loop?

Q Yes, I am talking about open versus closed loop. Does that affect at all the disposal, the sludge disposal system that one would have to employ?

A It could, but it's really not an overriding factor. For example, you can have an open loop system which could stabilize the sludge, using various commercial processes, and end up with a relatively inert, stable non-leaching material. You can have closed loop processes which could do the same thing. In practice, you would probably use a sludge stabilization system for those systems operating closed loop, since there would be less water or scrubber liquor to tie up.

Q And if one wanted to utilize a closed loop system and pond the sludge in a particular area, would that be a criteria or a consideration which could enter into the design of the flue gas system?

A Well, it would be an integral part of the design of the flue gas desulfurization system, but it would not affect the potential SO_2 removal efficiency.

Q Would not that be a limiting factor as far as the amount of sludge disposal is concerned?

A Well, the more SO_2 you remove from the flue gas, the more sludge you have to dispose of.

Q Right. How many of these plants have you visited personally that you've reported on in your exhibit?

A Well, of the operating plants, I've visited approximately ten.

Q Have you visited the Cholla plant?

A Yes, I have.

Q And when was that?

A That was probably about a year and a half ago.

Q And were both modules in operation at that time?

A Yes, they were.

Q A and B?

A Yes.

Q Were both towers packed?

A No, they were not.

Q Well, does that affect the SO_2 removal?

A It certainly does. Module A, which is a packed tower, removes approximately 92% of the SO_2 and Module B, which is not packed for various strange reasons, removes probably only 25%. This is where some of the misunderstanding comes in, because a lot of people average those two removal efficiencies and see that Cholla station is attaining only 58, 59%, but the truth is, the system can attain 92% removal efficiency by packing the other tower and making it similar in configuration to Module A.

Q Why haven't they packed it?

A Who knows?

Q Have you ever seen it in operation with both towers packed?

A I don't believe it's ever been in operation with both towers packed.

Q What has been the availability?

A The availability of that system was 100% in November -- well, let's talk about individual modules.

Q Yes, I read that, too, or was it before November?

A Well, it's averaged approximately 88% over the last six months.

Q And before that?

A I think it averaged over 90% the last six months for the preceding period. It's been a very well-performing system, and of course, the system which has been packed, and which removes the higher amount of SO_2, namely the 92% removal efficiency, is the system with which they have had the least amount of problems. The other system, because it was not packed and removed only a limited amount of SO_2, had problems with sulfuric acid concentration -- condensation.

Q In other words, your report here is that the substantial plugging of the packing in the mist eliminators being observed in June of '75 had to do with the unpacked tower?

A No, not at all, of course not.

Q So that when you report for Cholla that there's been substantial plugging of the packing, that's with regard to the packed tower, isn't it?

A Let's look at the availability in Module A during that month -- it was 100%. It was 97% the following month and 95% the month after that.

Q So Mr. Devitt, then the plugging didn't affect the unit?

A Well, it was not a catastrophic effect on the unit; it was not a significant effect on the unit. It's something that's not desirable, but it's something that can be lived with, and obviously, did not cause interference with the operation of that unit.

Q And of course, that goes back to the definition of availability?

A Yes, it does.

Q And that can be, by definition, misleading, can it not?

A Yes, it can.

Q And why is that?

A Well, there are several different manners in which you can describe it. If you care, I can go through them, three or four definitions, and discuss each.

Q They're already in there, aren't they?

A They are, under the definition section.

Q Were both Modules A and B -- well, let's say Module A -- available for removal at the same time that the boiler was available to run the plant?

A Yes, that's the way this is defined. It's FGD module operating hours divided by boiler operating hours, and for example, in December of '75, both ran for 740 hours, and that led to the availability of 100%.

Q Is that how you define availability on page 5 of your statement, line 26?

A Yes, it is.

Q Are there any removals of SO_2 in an efficiency of 70 to 80% for high sulfur coal?

A 70 to 80%? Probably. Why don't we briefly run through Table 3 and we'll identify them. Arizona Public Service is low sulfur coal. Will County operates at approximately 82%. Duquesne Light, the Phillips station -- that's an interesting station. There they have a two-stage Venturi scrubber and a single stage, three single-stage Venturi scrubbers, for a total of four modules. The SO_2 removal efficiencies for the three single-stage scrubbers are approximately 40%, with the two-stage Venturi, about 80%. They are currently evaluating what methods they will employ to increase the overall station control efficiency to 83%.

Q That's No. 28 that you're reading from? Is that your identification number?

A Yes, it is.

Q And is that a system that was designed by Chemico?

A Yes, it is.

Q Where the overall SO_2 removal efficiency is reported to be about 60% on the east single train and 90% for the two-stage train?

A That varies considerably, but that's, you know, in the ball park.

Q How is the availability?

A The unit has encountered a number of problems, in part due to the fact that it's a single-stage Venturi design for three of the modules, and they're in the process now of determining how they're going to increase the overall operating efficiency.

Q You mentioned earlier about the Paddy's Run plant. Does that run continuously on an open loop concept?

A No, neither one. It's a peaking boiler and operates on a closed loop.

Q That's a peak system?

A Yes. It has been, I believe, operating for the last four months on a Monday through Friday basis and it's had availabilities in excess of 90%.

Q And then it's shut down and cleaned and so forth, but it is not a base energy plant?

A Well, it's not a base energy plant, and it is shut down, but

It does not need cleaning on a weekend basis.

Q And when was that reported to you?

A Oh, I believe probably six weeks ago.

Q And is that in written form?

A We keep in contact by phone call. We also usually -- Mr.Vanness is a very cooperative gentleman from Louisville Gas and Electric and he usually sends us a letter confirming the information.

Q It does make a difference, however, whether the plant is going to be for base energy or for peak, does it not?

A Yes, it does. The Cholla plant, for instance, can be considered a base-loaded plant, and it, too has very high availabilities.

Q The Cholla plant has also been considered as a peak plant by Arizona Public Service, hasn't it?

A They described it to us as a base-loaded plant.

Q Have you ever talked to Mr. Abrams about the design characteristics or features of the Colstrip scrubber units after you received his material?

A No, I did not.

Q Do you know of any other plants that are under construction or contract at the present time that use the alkalinity nature of the fly ash?

A Other than Colstrip, no.

Q Do you know of any site restraints that are applicable to the Colstrip area with regard to sludge disposal?

A No, I do not.

Q Have you may any study with regard to any site constraints?

A I'd be happy to if I were retained by Montana Power, but my overall mission here was to describe the status of flue gas desulfurization technology in general and not to assess the requirements of the Colstrip station.

Q Your answer is no?

A That's correct.

Q Does the amount of suspended solids in the scrubber unit have anything to do with scaling?

A Yes, it does. You want to maintain a certain level of suspended solids in the recirculation liquor so that any scale that would form would form on these nuclei as opposed to on the scrubber vessel walls.

Q And would you want to maintain a higher percentage of suspended solids in a closed loop system than in an open loop system?

A Well, an open loop system, it's not as important. You would want to maintain a higher percent solids in a closed loop system to again, serve as sites of nucleation.

Q If only a lime system is used and not the available alkalinity nature of the fly ash, does that present a larger disposal problem?

A Well, yes, because you'd be removing larger quantities of sulfur dioxide and would form more calcium sulfates and sulfites; however, we're talking there in terms of total tonnage of material generated. When you say a disposal problem, by use of proper sludge stabilization processes, it should not create any greater problem if it is properly treated.

Q But then you also have a disposal problem with the fly ash, don't you?

A Yes, you do.

Q Doesn't it make sense to you as a chemical engineer to use the resource, that is, the alkalinity nature of the fly ash, to reduce disposal problems?

A Well, as a matter of fact, some of the commercial processes for sludge disposal, which form (?) compounds, which is a low grade of concrete, do use the fly ash in addition to other agents to stabilize sludge.

Q But they don't use them in the SO_2 removals for the absorption, do they?

A Well, you know, some of the trend has been away from combined fly ash SO_2 removal, and I think I'd have to agree with you. A number of designers are going away from combined fly ash SO_2 removal because of the complications that the fly ash presents in overall system chemistry.

Q If that chemistry, however, has been proven, would you say that would be a good system to install for a particulate site, considering all other matters that have to be considered in judging what system is going to be installed?

A Well, if you want to install a system with minimum adverse environmental impact, the answer is no.

Q How do you define -- you don't know the definition of that term, do you?

A I'm using that term from the standpoint of limiting the SO_2 and sulfate burden to the atmosphere.

Q And does that, in itself, reduce the amount of ground level concentrations?

A Well, I'm sure you've had testimony from a number of meteorologists, and I think they uniformly said yes to a question like that.

Q If the amount of emissions were approximately 42,000 tons per year at 73% removal efficiency, another 17% of the removal efficiency would be approximately 6,000 or 7,000 tons per year? Would that be significant?

A You're asking me, and I'm a chemical engineer. I believe it would be, because of all the equations and the dispersion modeling activities I have seen. The higher the sulfur dioxide emission, the higher the potential ground level concentration.

Q And does that affect -- would that amount affect anything with regard to public health or welfare?

A You'd better ask somebody, an ecologist, who specializes in this, on the effect on human health.

Q You have no opinion on that matter?

A Well, first, I haven't done any modeling studies, and secondly, I do not consider myself a qualified ecologist.

Q Have you testified in any other proceedings, Mr. Devitt, with regard to best available control technology?

A No, I haven't. By proceedings, are you referring to court proceedings such as we're involved in now?

Q Or any proceedings dealing with the installation of flue gas desulfurization systems?

A I've provided testimony before panels of the National Academy of Engineers and the National Academy of Sciences on the status of flue gas desulfurization technology.

Q I note that in your statement. My inquiry is, have you testified in any other proceedings dealing with any particular installation of flue gas desulfurization systems in any power plant? I assume the answer would be no.

A That's correct.

MR. PETERSON: I have nothing further.

HEARINGS EXAMINER: Mr. Sheridan, any redirect?

MR. SHERIDAN: Yes.

Redirect, by Department of Natural Resources and Conservation

By Mr. Sheridan:

Q Mr. Devitt, may I ask whether or not that was your only copy of the response of the Montana Power Company on your survey for EI?

A Yes, it is.

MR. SHERIDAN: Can we have that marked DNR Exhibit 31, and I'll ask you whether or not you received that document in the regular course of your employment on your project?

WITNESS: Yes, I did.

MR. SHERIDAN: We'll offer DNR Exhibit No. 31.

MR. PETERSON: I think it's already in evidence, Mr. Davis, as DNR Exhibit 4. That's what I was reading from.

MR. SHERIDAN: I'm not sure whether it is or it isn't.

HEARINGS EXAMINER: Why don't we do this? If it is, we'll put it in and --

MR. PETERSON: This is DNR Exhibit No. 4. Will you look at that and compare it?

WITNESS: The cover letter is missing, if that's of importance.

MR. PETERSON: There was no cover letter in DNR 4.

HEARINGS EXAMINER: Is that in the Health proceeding?

MR. SHERIDAN: Yes.

MR. PETERSON: Well, let him compare them.

MR. SHERIDAN: If it's the same, fine; I don't have any objection, but I just want to be sure that we get this in.

HEARINGS EXAMINER: I'll do this, if it isn't --

WITNESS: Perhaps this is just a bad copy, but pages -- page 3 is obliterated, page 4 is missing, and page 5 is missing from this copy of DNR 4.

MR. PETERSON: What are the pages?

MR. SHERIDAN: Let's be safe and offer DNR 31.

HEARINGS EXAMINER: Well, I've got your offer, and we'll let him voir dire on it.

MR. PETERSON: Well, my understanding was that all of the exhibits in the Department of Health or Board of Health hearing, went to the Board of Natural Resources. There are instances now where we have two exhibits with two different numbers, the same exhibits, and it just seems to me that those are the questionnaires -- our copy of the questionnaire that was given to the DNR and was introduced by Mr. Shenker.

WITNESS: Page 10 is also missing, as well as the cover letter.

HEARINGS EXAMINER: I'm going to rule that after we've had time to compare it, which I trust we can do between some time before we get through tomorrow and --

MR. SHERIDAN: That's fine with me. I just want to be sure that we get it in.

MR. PETERSON: What did you number that?

HEARINGS EXAMINER: 31.

MR. PETERSON: In lieu of DNR 4?

HEARINGS EXAMINER: No, it won't go in until it is compared.

MR. SHERIDAN: I have nothing further.

MR. PETERSON: That's all.

HEARINGS EXAMINER: Very well, Mr. Devitt, you are excused.

(WITNESS EXCUSED.)

HEARINGS EXAMINER: Do you want to try to go ahead this afternoon or are you going to wait until 9:00 o'clock in the morning?

MR. SHERIDAN: We're prepared to go ahead. We'll offer now Exhibit 140 with Mr. Devitt's testimony.

HEARINGS EXAMINER: Any objections, Mr. Peterson?

MR. PETERSON: I don't think it will do any good to object, anyway. Well, I'll object it's irrelevant.

HEARINGS EXAMINER: Overruled, it's admitted. You don't have too heavy a schedule tomorrow, and we're not going to work after five today, so would you rather wait and start on the next witness in the morning?

MR. PETERSON: That's fine with me.

MR. SHERIDAN: That's fine.

HEARINGS EXAMINER: Then let's recess until nine o'clock. I was originally given a witness list of 19 witnesses for the DNR, and we've now completed nine of them. We'd originally tried to schedule, planning that we'd have this week and next for DNR, Northern Cheyenne, Environmental Defense Fund, and Board of Health witnesses. Now I don't know whether the Board of Health will have any witnesses, but it now appears, as I understand it, we'll complete, or should complete, the DNR except for Dr. Gold and Dr. Hammer.

MR. SHERIDAN: Dr. Gordon and Dr. Hammer.

HEARINGS EXAMINER: Which witnesses are you not going to call? Dr. Ayers, or is that still questionable?

MR. SHERIDAN: It's questionable whether he's going to be available at this time, and the same is true for Mr. Forest of the Northern States Power Company.

HEARINGS EXAMINER: How about Mr. Tourangicean?

MR. SHERIDAN: I don't know that he will be able to prepare his statement in time, and if not, he'll just come in as a public witness.

HEARINGS EXAMINER: About Szablya?

MR. SHERIDAN: He'll be here tomorrow.

HEARINGS EXAMINER: I've been advised by Mr. Meloy that he won't be able to get his clients here next week. I also don't have any information about the Environmental Defense Fund, so next week, we have scheduled some public witnesses that we intend to start at 1:00 o'clock or 1:30, say, on Monday. We previously had had a rule that public witnesses would follow the case of the proponents and then follow the opponents, but if our case is going to be broken up and we are going to have time next week, it would be my wish that you would proceed, starting Monday afternoon, and continuing Tuesday, with public witnesses and get those in, so I'd like to hear any objection to that from any counsel who are here if you think that in any way prejudices anybody's case. They're going to testify at one juncture in this case, and I think it would be better than interrupting the case on down the road, as long as we've got this time. I have in mind now at least four that have written me, and I'll call them and see if they can come the first of the week.

MR. SHERIDAN: As I understand it, at the present time, we have one additional proponent public witness, is that right?

HEARINGS EXAMINER: Mr. Ross just informed me of two people that called today to testify. We have one scheduled for tomorrow, and that was from the Chamber of Commerce, and some are scheduled for next Monday. I'd like to try to wind up all the proponents' public witnesses if we've got time Monday, and then if some more want to come, we can continue on Tuesday. We have 45 proponents' public witnesses, and assuming we'll have that many on the other side, we might as well spend a couple of days in accommodating them as best we can. Do you know when you will be able to call Dr. Gordon?

MR. SHERIDAN: I would assume no sooner than Friday of next week, and most probably, after March 1st.

HEARINGS EXAMINER: Are you going to call and see if your other witness, Dr. Hammer, would be available next week?

MR. SHERIDAN: Right.

HEARINGS EXAMINER: If he were to be available next week and Dr. Gordon could testify Friday, you'd be in pretty good shape, I would assume.

MR. SHERIDAN: I hope so.

HEARINGS EXAMINER: You'll work that out tonight and perhaps we can do some planning tomorrow, then. Does anyone else have anything else? There's one thing that we discussed, and that was the fact that I got the idea somehow, from Arden, at one time, that you may have some deposition testimony that you're going to introduce?

MR. SHERIDAN: That's right.

HEARINGS EXAMINER: My recollection of the proceedings last time, is that when we got to that juncture, no one had served anyone with copies so they could read and prepare their objections, and he suggested, I think, that he's going to have those in.

MR. SHERIDAN: That's right, he'll be here Monday with them.

HEARINGS EXAMINER: Okay, fine, so that's going to be part of your case.

MR. SHERIDAN: That's right.

MR. BELLINGHAM: Statements of public witnesses opposing; have those come in as yet?

HEARINGS EXAMINER: I have the Stockgrowers', which came in this week, and I think I gave everyone a copy of it. I had a statement from the Wildlife Federation that I received last year, in 1975. I distributed it at that time, and I don't know whether they're going to attend or not. I wrote them back and told them the status of the proceedings. I had a statement from Mr. Clinton, of the Forest Service, and I don't know whether you have that or not. We had copies of that at one time and passed them out. We'll call him and see if he can come the first part of next week. Do you know anything about his schedule?

DR. GORDON: He has classes two days a week and can come on Monday or Wednesday.

HEARINGS EXAMINER: Will you see if he can come Monday, Dr. Gordon?

MR. PETERSON: I've got one other request.

HEARINGS EXAMINER: Yes, sir.

MR. PETERSON: I don't know when it was, Monday or Tuesday, I renewed my request of August 7, 1975 for an up to date general ledger sheet regarding the expenditures of the filing fee moneys for Colstrip units 3 and 4, and I asked Dr. Tsao about it this morning. He seemed to be somewhat uncertain about the request, but I would make it again for the record, that we be provided with a copy of that general ledger sheet, because I do intend to cross-examine him on some of the matters regarding expenditures.

HEARINGS EXAMINER: Mr. Doney, do you have any influence with the Department of Natural Resources?

MR. DONEY: None whatsoever, but I'll check on that.

HEARINGS EXAMINER: It would be nice if he had it before he testified. Let's recess.

HEARING RECESSED AT 4:40 P.M.